SEQUENCE LISTING

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      Seinost \ Gerald
      Dykhuizek, Danial
      Luft, Benjamin J.
      Maria J.C√ Gomes-Solecki
<120> Groups of Borrelia burgdorferi and
  Borrelia afzeli That Cause Lyme Disease in Humans
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1

3/102 ttg tcc\gga tca tta gaa agc tta tca aaa gca gct aaa gag atg ctt 528 Leu Ser kly Ser Leu Glu Ser Leu Ser Lys Ala Ala Lys Glu Met Leu 165 gct aat tca gtt aaa gag ctt aca agc cct gtt gtc cat gga tcc 573 Ala Asn Ser Wal Lys Glu Leu Thr Ser Pro Val Val His Gly Ser <210> 6 <211> 190 <212> PRT <213> borrelia burgðjorferi Ala Cys Asn Asn Ser Gl\(\chi\) Lys Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Asp Ser Asn Ala Val Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu Leu Ala Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp Gly Ser Leu Asp Asn Glu Ala Asn Arg Asn Glu Ser Leu Leu 55 Ala Gly Ala Tyr Thr Ile Ser Thr Leu Ile Thr Gln Lys Leu Ser Lys Leu Asn Gly Ser Glu Gly Leu Lys Glu Lys Ile Ala Ala Lys Lys 105 Cys Ser Glu Glu Phe Ser Thr Lys Leu\Lys Asp Asn His Ala Gln Leu Gly Ile Gln Gly Val Thr Asp Glu Asn Ala Lys Lys Ala Ile Leu Lys 120 Ala Asn Ala Ala Gly Lys Asp Lys Gly Val Glu Glu Leu Glu Lys Leu 135 Ser Gly Ser Leu Glu Ser Leu Ser Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val Lys Glu Leu Thr Ser Pro Val Val His Gly Ser 185 180 <210> 7 <211> 557 <212> DNA <213> Borrelia burgdorferi <220> <221> CDS <222> (1)...(557) atg gct tgt aat aat tca gga aaa gat ggg aat gca tct gca aat tct 48 Met Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Ala Ser Ala Asn Ser gct gat gag tct gtt aaa ggg cct aat ctt aca gaa ata agt aaa 96 Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys\Lys 20

| 4/102 | |
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| att aca gaa tot aac goa gtt gtt otg goo gtg aaa gaa gtt gag doo Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Val Glu Thr 45 | 144 |
| | 192 |
| | 240 |
| | 288 |
| gta ttg aaa aat gaa gaa tta aag gaa aag att gat aca gct aag caa Val Leu Lys Asn Glu Glu Leu Lys Glu Lys Ile Asp Thr Ala Lys Gln 100 105 | 336 |
| tgt tct aca gaa ttt act aat aaa cta aaa agt gaa cat gca gtg ctt Cys Ser Thr Glu Phe Thr Asn Lys Leu Lys Ser Glu His Ala Val Leu 125 | 384 |
| ggt ctg gac aat ctt act gat gat aat gca caa aga gct att tta aaa Gly Leu Asp Asn Leu Thr Asp Asp Asn Ala Gln Arg Ala Ile Leu Lys 130 | 432 |
| aaa cat gca aat aaa gat aag ggt gct gca gaa ctt gaa aag tta ttt Lys His Ala Asn Lys Asp Lys Gly Ala Ala Glu Leu Glu Lys Leu Phe 155 160 | 480 |
| aaa gcg gta gaa aac tta tca aaa gca gct caa gac aca tta aaa aat Lys Ala Val Glu Asn Leu Ser Lys Ala Ala Gln Asp Thr Leu Lys Asn 175 | 528 |
| gct gtt aaa gag ctt aca agt cct att gt Ala Val Lys Glu Leu Thr Ser Pro Ile 180 | 557 |
| <210> 8 <211> 184 <212> PRT <213> Borrelia burgdorferi | |
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| Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile | |
| Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Val Glu Thr Leu 45 40 45 40 45 | |
| 35 40 Leu Ala Ser Ile Asp Glu Leu Ala Thr Lys Ala Ile Gly Lys Lys Ile 50 55 60 Fin Can Luc Asp Thr Ser Leu Leu | |
| 55 Gly Asn Asn Gly Leu Glu Ala Asn Gln Ser Lys Asn Thr Ser Leu Leu 80 70 65 Ser Gly Ala Tyr Ala Ile Ser Asp Leu Ile Ala Glu Lys Leu Asn Val 90 | |
| Ser Gly Ala 171 115 90 | |

DSSSETE DETSID

| | _ |
|--|---|
| | 5/102 |
| Leu Lys Asn Glu Glu Leu Lys Glu Lys I | le Asp Thr Ala Lys Gln Cys 110 |
| Ser Thr Glu Phe Thr Asn Lys Leu Lys S | Ger Glu His Ala Val Leu Gly 125 |
| Leu Asp Asn Leu Thr Asp Asp Asn Ala G | Gln Arg Ala Ile Leu Lys Lys |
| His Ala Asn Lys Asp Lys Gly Ala Ala (| Glu Leu Glu Lys Leu Phe Lys 160 |
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| Val Lys Glu Leu Thr Ser Pro Ile 180 | |
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| aat aca tct gca aat tct gct gat gag Asn Thr Ser Ala Asn Ser Ala Asp Gla 20 | tct gtt aaa ggg cct aat ctt 96 Ser Val Lys Gly Pro Asn Leu 30 |
| aca gaa ata agt aaa aaa att acg gat Thr Glu Ile Ser Lys Lys Ile Thr Asp 35 | tot aat gcg gtt tta ctt gct 144 Ser Asn Ala Val Leu Leu Ala 45 |
| gtg aaa gag gtt gaa gcg ttg ctg tca Val Lys Glu Val Glu Ala Leu Leu Ser 50 | a tot ata gat gaa att got got 192 Ser Ile Asp Glu Ile Ala Ala 60 |
| aaa gct att ggt aaa aaa ata cac caa Lys Ala Ile Gly Lys Lys Ile His Gli 65 | a aat aat ogt ttg gat acc gaa 240 n Asn Asn Gly Leu Asp Thr Glu 75 80 |
| aat aat cac aat gga tca ttg tta gc Asn Asn His Asn Gly Ser Leu Leu Al 85 | g gga gct tat gca ata tca acc 288 a Gly Ala Tyr Ala Ile Ser Thr 90 95 |
| cta ata aaa caa aaa tta gat gga tt Leu Ile Lys Gln Lys Leu Asp Gly Le 100 | 110 |
| aaa att gat gcg gct aag aaa tgt to Lys Ile Asp Ala Ala Lys Lys Cys Se 115 | 125 |
| aaa gaa aaa cac aca gat ctt ggt aa Lys Glu Lys His Thr Asp Leu Gly Ly 130 | aa gaa ggt gtt act gat gct gat 432 ys Glu Gly Val Thr Asp Ala Asp 140 |
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|----------------------|--------------------------|-------------|-------------------|-------------------|------------|------------|------------|-------------------|-------------------|----------|------------|--------------|--------------|-------------------|------------------------|--------------|--------|
| gca a Ala I | aaa | gaa | gcc | att | tta Len | aaa Lvs | aca Thr | aat Asn | ggt Gly | ac Th | et a | aaa Lys | act Thr | aaa Lys | ggt Gly | gct Ala | 480 |
| 145 | | | \ | | 120 | | | | | | | | | | | | |
| gaa (Glu (| gaa Glu | ctt Leu | gga Gly | aaa Lys 165 | tta Leu | ttt Phe | gaa Glu | tca Ser | gta Val 170 | | ag (lu | gtc Val | ttg Leu | tca Ser | aaa Lys 175 | gca Ala | 528 |
| gct a | aaa Lys | gag Glu | atg Met 180 | ctt Leu | gct Ala | aat Asn | tca Ser | gtt Val 185 | -1- | a g | ag lu | ctt Leu | aca Thr | agc Ser 190 | cct Pro | gtt Val | 576 |
| | | | 100 | | | | | | | | | | | | | | 579 |
| gtg Val | | | | | / | \ | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| <210 <211 <212 | > 1 > P | 92 RT | 140 | hura | dorf | eri | \ | | | | | | | | | | |
| | | | | | dorf | | | | | | | | | | | | |
| | Leu | Phe | | | | | | | | | | | | | | Asn | |
| 1 Thr | Ser | Ala | a Asn | Ser | Ala | Asp | Glu | Sei | r Va | 1 1 | Lys | Gly | 7 Pro | Asn 30 | Leu | Thr | |
| Glu | Ile | Sei | 20 Lys | . Lys | : Ile | Thr | Asp | ste: | r As | n I | Ala | Va] | Leu 45 | Lev | ı Ala | a Val | |
| Lys | Glu | 35 1 Val | l Glu | ı Ala | a Leu | Lev | 40 Ser | Se | 11 | e i | Asp | Glu 60 | ı Ile | Ala | a Ala | a Lys | |
| Ala | 50 Il∈ | e Gly | y Lys | ь Гуз | s Ile | His | Glr | a As | n As | sn ' | Gly 75 | Let | ı Asp | Thi | Gl: | Asn 80 | |
| 65 Asn | His | s Ası | n Gly | y Sei | r Leu | . Le | ı Ala | a Gl | y Al | \a | Tyr | Ala | a Ile | e Sei | r Th: 95 | r Leu | |
| Ile | Lys | s Gl | n Ly: | 85 Lei | u Asp | Gly | y Le | Ly ۱۵ | s As | sn\ | Glu \ | Gl | y Le | Ly: 11 | s Gl [.] O | u Lys | |
| Ile | . Ası | p Al | 100 a Ala | 0 a Ly: | s Lys | з Су: | s Se | r Gl | u T | hr | Phe | Th | r Ası 12 | n Ly | s Le | u Lys | 3 |
| Glu | Ly: | 11 s Hi | 5 s Th | r As | p Let | ı Gl | y Ly | s Gl | .u G | ly | va | Th | r Asj | p Al | a As | p Ala | 1 |
| Lys | 13 Gl: | 0 u Al | a Il | e Le | u Ly | s Th | r As | n Gl | у Т | hr | Lys 155 | s T h | r Ly | s Gl | y Al | a Glu 160 | 1) |
| 145 Glu | i 1 Le | u Gl | у Гу | s Le | u Ph | e Gl | u Se | r Va | al G | lu 70 | Va] | l Le | \ Se | r Ly | s Al 17 | a Ala 5 | a. |
| Lys | s Gl | u Me | t Le | u Al | a As | n Se | r Va | l Ly | ys G 35 | lu | Lev | u Th | r S e | r Pr 19 | o Va | ıl Val | l |
| | | | 18 | U | | | | | ,, | | | | 1 | \ | | | |
| <2: <2: | 10> 11> 12> 13> | 582 DNA | relia | a bro | gdorf | eri | | | | | | | | | \ | | |
| <2 | 20> 21> 22> | CDS | (! | 582) | | | | | | | | | | | \ | | · |

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|-------------------------|---------------------|-------------------|------------------|-----------------------|-------------------|-------------------|-------------------|--------------------|----------------------|---|---------------------|-------------------|------------------|----------------------|-----------------------|-----|
| aat Asn | aca Thr | tct Ser | gca Ala 20 | aat Asn | tct Ser | gct Ala | gat Asp | gag Glu 25 | tct Ser | gtt Val | aaa Lys | ggg Gly | cct Pro 30 | aat Asn | ctt Leu | 96 |
| aca Thr | gaa Glu | ata Ile 35 | agt Ser | aaa Lys | aaa Lys | att Ile | acg Thr 40 | gat Asp | tct Ser | aat Asn | gcg Ala | gtt Val 45 | tta Leu | ctt Leu | gct Ala | 144 |
| gtg Val | aaa Lys 50 | Glu | gtt Val | gaa Glu | gcg Ala | ttg Leu 55 | ctg Leu | tca Ser | tct Ser | ata Ile | gat Asp 60 | gag Glu | ctt Leu | gct Ala | aaa Lys | 192 |
| gct Ala 65 | Ile | ggt Gly | aaa Lys | aaa Lys | ata Ile 70 | aaa Lys | aac Asn | gat Asp | ggt Gly | agt Ser 75 | БСи | gat Asp | aat Asn | gaa Glu | gca Ala 80 | 240 |
| aat Asn | cgc Arg | aac Asn | gag Glu | tca Ser 85 | ttg Leu | tta Leu | gca Ala | gga Gly | gct Ala 90 | тУr | aca Thr | ata Ile | tca Ser | acc Thr 95 | tta Leu | 288 |
| Ile | Thr | Gln | Lys 100 | | Ser | гуѕ | гей | 105 | i Gly | 261 | . 010 | . 017 | 110 |) | | 336 |
| aag Lys | att Ile | gco Ala 115 | a Ala | gct Ala | aag Lys | aaa Lys | tgc Cys 120 | 26/1 | gaa Glu | gaç Glu | g ttt i Phe | agt Ser 125 | | aaa Lys | cta Leu | 384 |
| aaa Lys | gat S Asp 130 | e Ası | t cat n His | gca Ala | cag Gln | ctt Leu 135 | . GTZ | ata / Ile | a cag e Glr | g ggo n Gly | gtt y Val 140 | | gat Asp | gaa Glu | a aat 1 Asn | 432 |
| gca Ala | а Ly | a aaa s Ly | a gct s Ala | att a Ile | tta Leu 150 | і Га | gca Ala | a aat a Asi | t gca n Ala | 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | a G. | t aaa y Ly: | a gat s Asj | t aaq p Lys | g ggc s Gly 160 | 480 |
| gt! Va. | t ga l Gl | a ga u Gl | a cti u Lei | t gaa u Glu 165 | і ГА | g tto s Lei | g tco i Se: | c gg r Gl | a tca y Se: 17 | т пе | a gad u Gl | a age u Se: | c tt r Le | a tca u Se: 17 | a aaa r Lys 5 | 528 |
| gc | a gc a Al | t aa a Ly | a ga s Gl | u Met | g cti t Le | t gc¹ u Ala | aa a As | t tc n Se 18 | 1 40 | t aa l Ly | a ga s Gl | g ct u De | t ac u Th | | c cct r Pro | 576 |
| | t gt 1 Va | | | | | | | | | | | | | \ | | 582 |
| | 10> | | | | | | | | | | | | | | \ | |
| k 2 | 12> | PRT | relia | brg | dorf | eri | | | | | | | | | | Λ. |
| / | | | | | | | | | | | | | | | | |

Thr Leu Phe Leu\Phe Ile Ser Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Asp Ser Asn Ala Val Leu Leu Ala Val 40 Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu Leu Ala Lys Ala 35 55 Ile Gly Lys Lys Ile Lys Asn Asp Gly Ser Leu Asp Asn Glu Ala Asn Arg Asn Glu Ser Leu Leu Ala Gly Ala Tyr Thr Ile Ser Thr Leu Ile 90 Thr Gln Lys Leu Ser Lys Leu Asn Gly Ser Glu Gly Leu Lys Glu Lys 110 105 Ile Ala Ala Lys Lys Cys Ser Glu Glu Phe Ser Thr Lys Leu Lys 120 Asp Asn His Ala Gln Leu Gly Ile Gln Gly Val Thr Asp Glu Asn Ala 140 135 Lys Lys Ala Ile Leu Lys Ala\Asn Ala Ala Gly Lys Asp Lys Gly Val 155 150 Glu Glu Leu Glu Lys Leu Ser Aly Ser Leu Glu Ser Leu Ser Lys Ala 170 165 Ala Lys Glu Met Leu Ala Asn Se k Val Lys Glu Leu Thr Ser Pro Val 185 180 Val <210> 13 <211> 576 <212> DNA <213> Borrelia burgdorferi <220> <221> CDS <222> (1)...(576) atg act tta ttt tta ttt ata tct tgt aat aat tca gga aaa gat ggg Met Thr Leu Phe Leu Phe Ile Ser Cys Asn Asn Ser Gly Lys Asp Gly aat gca tct gca aat tct gct gat gag tct gtt aaa ggg cct aat ctt 96 Asn Ála Ser Ála Asn Ser Ála Ásp Glu Ser Val Lys Gly Pro Asn Leu aca gaa ata agt aaa aaa att aca gaa tot aac gca gt gtt ctg gcc Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala 144 35 gtg aaa gaa gtt gag acc tta ctt gca tct ata gat gaa cat gct acc 192 Val Lys Glu Val Glu Thr Leu Leu Ala Ser Ile Asp Glu Led Ala Thr 50 aaa gct att ggt aaa aaa ata ggc aat aat ggt tta gag gcc aat cag 240 Lys Ala Ile Gly Lys Lys Ile Gly Asn Asn Gly Leu Glu Ala Asn Gln

| | | | / | | | | | | | | 9/1 | 02 | | | | | | |
|---|--------------------------|-------------------|------------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----|
| , | agt Ser | aaa Lys | a. A | ad sn | aca Thr | tca Ser 85 | ttg Leu | tta Leu | tca Ser | gga Gly | gct Ala 90 | tat Tyr | gca Ala | ata Ile | tct Ser | gac Asp 95 | cta Leu | 288 |
| | ata Ile | gca Ala | g G | lu | aaa Lys 100 | tta Leu | aat Asn | gta Val | ttg Leu | aaa Lys 105 | aat Asn | gaa Glu | gaa Glu | tta Leu | aag Lys 110 | gaa Glu | aag Lys | 336 |
| | att Ile | gat Asp | T | ca hr 15 | gct Ala | aag Lys | caa Gln | tgt Cys | tct Ser 120 | aca Thr | gaa Glu | ttt Phe | act Thr | aat Asn 125 | aaa Lys | cta Leu | aaa Lys | 384 |
| | agt Ser | gaa Glu 130 | ı H | at | gca Ala | gtg Val | ctt Leu | ggt Gly 135 | ctg Leu | gac Asp | aat Asn | ctt Leu | act Thr 140 | gat Asp | gat Asp | aat Asn | gca Ala | 432 |
| | caa Gln 145 | aga Ar | a g | ıct Ma | att Ile | tta Leu | aaa Lys 150 | Дуѕ | cat His | gca Ala | aat Asn | aaa Lys 155 | gat Asp | aag Lys | ggt Gly | gct Ala | gca Ala 160 | 480 |
| | gaa Glu | ct Le | t ç u G | gaa Slu | aag Lys | tta Leu 165 | Phe | aaa Lys | gcg Ala | gta Val | gaa Glu 170 | ASII | tta Leu | tca Ser | aaa Lys | gca Ala 175 | gct Ala | 528 |
| | caa Gln | ga As | c a | aca [hr | tta Leu 180 | Lys | aat Asn | gct Ala | gtt Val | aaa Lys 185 | GIU | ctt Leu | aca Thr | agt Ser | Pro 190 | | gtg Val | 576 |
| | <21 <21 <21 <21 | 1> 2> | 19: PR' | Т | lia | burg | jdorf | eri | | \ | | | | | | | | |
| | <40 | 0> | 14 | Dh a | T 01 | , Dhe | . Tla | Sei | · Cvs | s Asr | \ n Asr | Sei | r Gly | , Lys | a Asp | Gly | y Asn | |
| | _ | | | | | | | | | | 111 | • | | | | | ı Thr | |
| | | | | | \sim | | | | | / 7 | | , | | | | | | |
| | | | | 2 = | | | | | 40 | | | | 1 | 30 | | | a Val | |
| | | | ` | Val | | | | 55 | | | | | UV | | | | r Lys | |
| | | a I | lе | | | | 77.0 | | | | | 13 | | ` | | | n Ser 80 | |
| | 65 Lys | 5 A: | sn | Thr | s Se | r Le | u Le | u Se | r Gl | y Al | а Ту 90 | r Al | a Il | e \$e | r As | р Le 95 | u Ile | |
| | Ala | a G | lu | Lys | s Le | 85 u As | n Va | l Le | u Ly | s As 10 | n Gl | u Gl | u Le | u Ly | S Gl | u Ly 0 | s Ile | |
| | Ası | р Т | hr | | | o s Gl | n Cy | s Se | r Th | r Gl | u Ph | e Th | r As | n Ly 12 | s \Le 5 | u Ly | s Ser | |
| | Gl | | | 11: Ala | a Va | l Le | u Gl | y Le 13 | 12 u As | p As | n Le | u Th | r As 14 | p As | | n Al | a Gln | |
| | Ar | 1 gA | 30 la | Ile | e Le | u Ly | s Ly | s Hi | s Al | a As | n Ly | s As | p Ly | s Gl | y Al | .a\Al | a Glu 160 | |
| | | _ | | | | | e Ly | 41 | | | | n Le | | | | • | a Gln | |
| ١ | | | | | | | | | | | | | | | | | | |

| i | Asp 1 | Thr I | Leu\I | ys <i>1</i> 180 | Asn <i>P</i> | Ala V | /al I | Lys (| Slu 1 185 | Leu ' | Thr | Ser | Pro | Ile 190 | Val | | |
|---|----------------------------------|-------------------|------------------|--------------------|----------------------|-----------------------|-------------------|-------------------|-------------------|--------------------|------------------|------------------|-------------------|-----------------------|-------------------|---------------------|-----|
| | <2102 <2112 <2122 <2132 | > 570 > DN2 | Ą | ia b | urgd | orfe | ri | | | | | | | | | | |
| | <220 <221 <222 | > CD | | (576 | ,\ | | | | | | | | | | | | |
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| | aat Asn | gca Ala | tct Ser | aca Thr 20 | aat Asn | tct Ser | gcc | gat Asp | gag Glu 25 | tct Ser | gtt Val | aaa Lys | ggg Gly | cct Pro 30 | aat Asn | ctt Leu | 96 |
| | aca Thr | gaa Glu | ata Ile 35 | agt Ser | aaa Lys | aaa Lys | att Ile | aca Thr 40 | gaa Glu | tct Ser | aac Asn | gca Ala | gtt Val 45 | gtt Val | ctg Leu | gcc Ala | 144 |
| | gtg Val | aaa Lys 50 | gaa Glu | gtt Val | gag Glu | acc Thr | tta Leu 55 | att Leu | gca Ala | tct Ser | ata Ile | gat Asp 60 | gaa Glu | ctt Leu | gct Ala | acc Thr | 192 |
| | aaa Lys 65 | gct Ala | att Ile | ggt Gly | aag Lys | aaa Lys 70 | ata Ile | ggc Gly | aat | aat Asn | ggt Gly 75 | ВСС | gag Glu | gcc Ala | aat Asn | cag Gln 80 | 240 |
| | agt Ser | aaa Lys | aac Asn | aca Thr | tca Ser 85 | ttg Leu | tta Leu | tca Ser | gga Gly | gct Ala 90 | -1- | gca Ala | ata Ile | tct Ser | gac Asp 95 | cta Leu | 288 |
| | ata Ile | gca Ala | gaa Glu | aaa Lys 100 | Leu | aat Asn | gta Val | ttg Leu | aaa Lys 105 | HSI. | gaa | ı gaa ı Glu | tta Leu | a aag 1 Lys 110 | g gaa Glu) | aag Lys | 336 |
| | att Ile | gat Asp | aca Thr | Ala | aag Lys | caa Gln | tgt Cys | tct Ser 120 | TIII | gaa Glu | tt 1 Phe | act Thi | aat Asr 125 | | a cta s Leu | aaa Lys | 384 |
| | agt Ser | gaa Glu 130 | His | gca Ala | ı gtg ı Val | ctt Leu | ggt Gly 135 | пес | gaq Asp | aat Asi | t cti n Lei | t act | _/1 | t gat p Asp | t aat o Asr | gca Ala | 432 |
| | caa Glr 145 | a aga n Arg | | att i Ile | tta e Lev | a aaa a Lys 150 | з гля | cat His | gca Ala | a aa a Asi | t aaa n Lya | - 210 | t aa p Ly: | g gg | t gct y Ala | gca Ala 160 | 480 |
| | | | gaa 1 Glu | a aaq ı Ly: | g tta s Lev 16 | ı Phe | aaa E Lys | a gco | g gta a Va | a ga 1 G1 17 | u no | c tt n Le | a tc u Se | a aa r Ly | a gc. | a gct a Ala 5 | 528 |

caa gac aca tta aaa aat gct gtt aaa gag ctt aca agt cct att gtg Gln Asp Thr Leu Lys Asn Ala Val Lys Glu Leu Thr Ser Pro Ile Val 185 <210> 16 <211> 191 <212> PRT <213> borrelia bungdorferi <400> 16 Thr Leu Phe Leu Phe tle Ser Cys Asn Asn Ser Arg Lys Asp Gly Asn Ala Ser Thr Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr 25 Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Val Glu Thr Leu Leu Ala Ser Ile Asp Glu Leu Ala Thr Lys Ala Ile Gly Lys Lys Ile Gly Asn Asn Gly Leu Glu Ala Asn Gln Ser 70 Lys Asn Thr Ser Leu Leu Ser\Gly Ala Tyr Ala Ile Ser Asp Leu Ile 90 85 Ala Glu Lys Leu Asn Val Leu Dys Asn Glu Glu Leu Lys Glu Lys Ile 105 Asp Thr Ala Lys Gln Cys Ser Th 120 Glu His Ala Val Leu Gly Leu Asp \Asn Leu Thr Asp Asp Asn Ala Gln 140 135 Arg Ala Ile Leu Lys Lys His Ala Asn Lys Asp Lys Gly Ala Ala Glu 155 150 Leu Glu Lys Leu Phe Lys Ala Val Glu\Asn Leu Ser Lys Ala Ala Gln Asp Thr Leu Lys Asn Ala Val Lys Glu Neu Thr Ser Pro Ile Val 185 <210> 17 <211> 573 <212> DNA <213> Borrelia burgdorferi <220> <221> CDS <222> (1)...(573) atg act tta ttt tta ttt ata tct tgt aat aat tca gg aaa gat ggg <400> 17 48 Met Thr Leu Phe Leu Phe Ile Ser Cys Asn Asn Ser $\widehat{ ext{Gl}\chi}$ Lys Asp $\widehat{ ext{Gl}\gamma}$ aat aca tet gea aat tet get gat gag tet gtt aaa ggg eet aat ett 96 Asn Thr Ser Ála Asn Ser Ála Ásp Glu Ser Val Lys Gly Pro Asn Leu aca gaa ata agt aaa aaa att aca gaa tot aac goa gtt gtt δ tc goo Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala 45 40

mi,

gtg aaa gaa gtt gaa act ttg ctt aca tct ata gat gag ctt gct aaa 192 Val Lys Glu\ Val Glu Thr Leu Leu Thr Ser Ile Asp Glu Leu Ala Lys 50 gct att ggt aaa aaa aaa aac gat gtt agt tta gat aat gag gca Ala Ile Gly Lys Lys Ile Lys Asn Asp Val Ser Leu Asp Asn Glu Ala 70 gat cac aac gga tca tta ata tca gga gca tat tta att tca aac tta Asp His Asn Gly Ser Leu Ile Ser Gly Ala Tyr Leu Ile Ser Asn Leu ata aca aaa aaa ata\ agt gca ata aaa gat tca gga gaa ttg aag gca 336 Ile Thr Lys Lys Ile\Ser Ala Ile Lys Asp Ser Gly Glu Leu Lys Ala 105 100 gaa att gaa aag gct aag aaa tgt tct gaa gaa ttt act gct aaa tta 384 Glu Ile Glu Lys Ala Lys Lys Cys Ser Glu Glu Phe Thr Ala Lys Leu 120 115 aaa ggt gaa cac aca gat tt ggt aaa gaa ggc gtt act gat gat aat 432 Lys Gly Glu His Thr Asp Leu Gly Lys Glu Gly Val Thr Asp Asp Asn 13\5 130 480 gca aaa aaa gcc att tta aaa\aca aat aat gat aaa act aag ggc gct Ala Lys Lys Ala Ile Leu Lys Thr Asn Asn Asp Lys Thr Lys Gly Ala 150 155 145 gat gaa ctt gaa aag tta ttt gaa tca gta aaa aac ttg tca aaa gca 528 Asp Glu Leu Glu Lys Leu Phe Glu Ser Val Lys Asn Leu Ser Lys Ala 170 165 573 gct aaa gag atg ctt act aat tca gt aaa gag ctt aca agc cct Ala Lys Glu Met Leu Thr Asn Ser Vall Lys Glu Leu Thr Ser Pro 185 <210> 18 <211> 190 <212> PRT <213> Borrelia burgdorferi <400> 18 Thr Leu Phe Leu Phe Ile Ser Cys Asn Asn Set Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys \Gly Pro Asn Leu Thr 25 Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Leu Ala Val Lys Glu Val Glu Thr Leu Leu Thr Ser Ile Asp Glu Leu Ala Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp Val Ser Leu Asp Asn Glu Ala Asp

His Asn Gly Ser Leu Ile Ser Gly Ala Tyr Leu Ile Ser\Asn Leu Ile

Thr Lys Lys Ile Ser Ala Ile Lys Asp Ser Gly Glu Leu Lys Ala Glu 105

100

| / | | | | | | | | | | | | | | | | | |
|---|------------------|--------------------|-------------------|-------------------|------------------|------------------|-------------------|-------------------|-------------------|------------------|------------------|-----------------------|-------------------|-------------------|------------------|------------------|-----|
| • | Ile | 2 | እ 15 | | | | | 120 | | | | | 120 | | | | |
| | Gly | Glu F | H | | | | 135 | | | | | 140 | | | | | |
| | Lys | Lys A | | \ | | 150 | | | | | 155 | | | | | 100 | |
| | Glu : | | | _ \ | 165 | | | | | 170 | | | | | Ala 175 | Ala | |
| | Lys | Glu 1 | Met | Leu\ 180 | Thr | Asn | Ser | Val | Lys 185 | Glu | Leu | Thr | Ser | Pro 190 | | | |
| | | > 55 > DN | 3 A | ia h | ourgo | lorfe | eri | | | | | | | | | | |
| | | > > CD > (1 | | (55 | 3) | -\ | | | | | | | | | | | |
| | ata | > 19 act Thr | tta | ttt Phe | tta Leu 5 | ttt Phe | ata Ile | tct Ser | tgt Cys | aat Asn 10 | aat Asn | tca Ser | gga Gly | aaa Lys | gat Asp 15 | ggg | 48 |
| | aat Asn | aca Thr | tct Ser | gca Ala 20 | aat Asn | tct Ser | gct Ala | gat Asp | gag Glu 25 | Ser | gtt Val | aaa Lys | ggg Gly | cct Pro 30 | aat Asn | ctt Leu | 96 |
| | aca Thr | gaa Glu | ata Ile 35 | agt Ser | aaa Lys | aaa Lys | att Ile | aca Thr 40 | GTA | tct Ser | aac Asn | gca Ala | gtt Val 45 | gtt Val | ctg Leu | gct Ala | 144 |
| | gtg Val | aaa Lys 50 | gaa Glu | att Ile | gaa Glu | act Thr | ttg Leu 55 | Leu | gca Ala | tet | ata Ile | gat Asp 60 | GIU | ctt Leu | gct Ala | act Thr | 192 |
| | aaa Lys 65 | gct Ala | att Ile | ggt Gly | aaa Lys | aaa Lys 70 | Ile | gat Asp | aac Asn | aat Asn | gct Ala 75 | ggt Gly | ttg Leu | ggt Gly | gct Ala | gaa Glu 80 | 240 |
| | gtg Val | ggt Gly | caa Gln | aac Asn | gga Gly 85 | tca Ser | ttg Leu | cta Leu | gca Ala | gga Gly 90 | ATa | tat Tyr | gca Ala | atc Ile | tca Ser 95 | 1111 | 288 |
| | gta Val | ata Ile | ata Ile | gaa Glu 100 | aaa Lys | ttg Leu | agc Ser | aca Thr | tta Leu 105 | і гАя | a aat s Asr | gta Val | gaa Glu | gaa Glu 110 | пец | aaa Lys | 336 |
| | gaa Glu | aaa Lys | att Ile 115 | Thr | aag Lys | gct Ala | aaç Lys | gat Asp 120 | Cys | tct Sei | gaa Glu | a aaa 1 Lys | tto Phe 125 | : 1111 | aaa Lys | aaa Lys | 384 |
| | tta Leu | aaa Lys 130 | Asp | ago Sei | c cgc Arg | gca Ala | gaç Glu 135 | ı Leı | ggt Gly | aaa y Lys | a aaa s Lys | a gat s Asp 140 |) Ala | agt Ser | gat | gat Asp | 432 |

sult Al

| | | | | | | | | | 14/. | 102 | | | | | | |
|-------------------|----------------------------------|-----------------|-------------------|-------------------|-------------------|------------|------------|------------|-------------------|-------------------|------------|------------|------------|-------------------|-------------------|-----|
| gat Asp 145 | gca Ala | aaa Lys \ | aaa Lys | gct Ala | att Ile 150 | tta Leu | aaa Lys | aca Thr | aat Asn | caa Gln 155 | gct Ala | aac Asn | gat Asp | aag Lys | ggt Gly 160 | 480 |
| gct Ala | aaa Lys | gaa Glu | ctt Leu | aaa Lys 165 | gag Glu | tta Leu | ttt Phe | gaa Glu | gca Ala 170 | gta Val | gaa Glu | agc Ser | ttg Leu | tca Ser 175 | aaa Lys | 528 |
| gcg Ala | gct Ala | aaa Lys | gag Glu 180 | atg Met | cta Leu | aac Asn | aag Lys | t | | | | | | | | 553 |
| <21 <21 | 0> 20 1> 18 2> PF 3> Bo | 33 RT | lia k | outgo | dorfe | eri | | | | | | | | | | |
| | 0> 20 | | | \ | | | | | | | | | | | | |
| Thr 1 | Leu | Phe | Leu | Phe' | \Ile | Ser | Cys | Asn | Asn 10 | Ser | Gly | Lys | Asp | Gly 15 | Asn | |
| | Ser | Ala | Asn 20 | Ser | Ala | Asp | Glu | Ser 25 | | Lys | Gly | Pro | Asn 30 | | Thr | |
| Glu | Ile | | | Lys | 116 | Thr | Glu 40 | | Asn | Ala | Val | Val 45 | | Ala | Val | |
| Lys | Glu | 35 Ile | Glu | Thr | Leu | Leu | | Ser | Ile | Asp | Glu 60 | | Ala | Thr | Lys | |
| Ala 65 | 50 Ile | Gly | Lys | Lys | Ile 70 | Asp | Asn | Asn | Ala | Gly 75 | | Gly | Ala | Glu | Val 80 | |
| | Gln | Asn | Gly | | | Led | Ala | Gly | | . • | Ala | Ile | Ser | Thr 95 | | |
| Ile | Ile | Glu | | 85 Leu | Ser | Thr | Leu | Lys 105 | 90 Asn | Val | Glu | Glu | Leu 110 | | Glu | |
| Lys | Ile | Thr 115 | 100 Lys | Ala | Lys | Asp | Cys 120 | | Glu | Lys | Phe | Thr 125 | | Lys | Leu | |
| Lys | Asp 130 | | Arg | Ala | Glu | Leu 135 | | Lys | Lys | Asp | Ala 140 | | Asp | Asp | Asp | |
| | Lys | Lys | Ala | Ile | Leu 150 | | Thr | Asn | Gln | Ala 155 | | Asp | Lys | Gly | Ala 160 | |
| 145 Lys | Glu | Leu | Lys | | Leu | | Glu | Ala | Val 170 | | Ser | Leu | Ser | Lys 175 | | |
| Ala | Lys | Glu | Met 180 | | Asn | | | ` | 1,0 | | | | | 175 | | |
| <21 <21 | 0> 2: 1> 58 2> DI 3> Bo | 32 NA | lia 1 | burgo | dorf | eri | | | | | | | | | | |
| | 0> 1> C! 2> (: | | . (58 | 2) | | | | | | \ | | | | | | |
| atq | 0> 2: act Thr | tta | ttt Phe | tta Leu 5 | ttt Phe | ata Ile | tct Ser | tgt Cys | aat Asn 10 | aat Asn | tca Ser | gga Gly | aaa Lys | gat Asp 15 | ggg | 48 |

| | \ | | | | | | | | 15/1 | 102 | | | | | | |
|-------------------|----------------------------------|---------------------|--------------------|-------------------|-------------------|------------------|-------------------|-------------------|---------------------|-------------------|---------------------|-------------------|-------------------|-------------------|-------------------|-----|
| aat Asn | ada Thi | tct Ser | gca Ala 20 | aat Asn | tct Ser | gct Ala | gat Asp | gag Glu 25 | tct Ser | gtt Val | aaa Lys | ggg Gly | cct Pro 30 | aat Asn | ctt Leu | 96 |
| aca Thr | gaa Glu | ata Ile 35 | agt Ser | aaa Lys | aaa Lys | att Ile | aca Thr 40 | gaa Glu | tct Ser | aac Asn | gca Ala | gtt Val 45 | gtt Val | ctg Leu | gct Ala | 144 |
| gtg Val | aaa Lys 50 | gaa Glu | att Ile | gaa Glu | act Thr | ttg Leu 55 | ctt Leu | gca Ala | tct Ser | ata Ile | gat Asp 60 | gaa Glu | ctt Leu | gct Ala | act Thr | 192 |
| aaa Lys 65 | gct Ala | att Ile | ggt\ Gly | aaa Lys | aaa Lys 70 | ata Ile | caa Gln | caa Gln | aat Asn | ggt Gly 75 | ggt Gly | tta Leu | gct Ala | gtc Val | gaa Glu 80 | 240 |
| gcg Ala | ggg Gly | cat His | aat Asn | gga Gly 85 | aca Thr | ttg Leu | tta Leu | gca Ala | ggt Gly 90 | gct Ala | tat Tyr | aca Thr | ata Ile | tca Ser 95 | aaa Lys | 288 |
| cta Leu | ata Ile | aca Thr | caa Gln 100 | aaa Lys | tta Leu | gat Asp | gga Gly | ttg Leu 105 | aaa Lys | aat Asn | tca Ser | gaa Glu | aaa Lys 110 | tta Leu | aag Lys | 336 |
| gaa Glu | aaa Lys | att Ile 115 | gaa Glu | aat Asn | gct Ala | aag Lys | aaa Lys 120 | tgt Cys | tct Ser | gaa Glu | gat Asp | ttt Phe 125 | act Thr | aaa Lys | aaa Lys | 384 |
| cta Leu | gaa Glu 130 | gga Gly | ga a Glu | cat His | gcg Ala | ca Gln 135 | ctt Leu | gga Gly | att Ile | gaa Glu | aat Asn 140 | gtt Val | act Thr | gat Asp | gag Glu | 432 |
| aat Asn 145 | gca Ala | aaa Lys | aaa Lys | gct Ala | att Ile 150 | tta Leu | ata Ile | aca Thr | g a t Asp | gca Ala 155 | gct Ala | aaa Lys | gat Asp | aag Lys | ggc Gly 160 | 480 |
| gct Ala | gca Ala | gag Glu | ctt Leu | gaa Glu 165 | aag Lys | cta Leu | ttt Phe | aaa Lys | gca Ala 170 | gta Val | gaa Glu | aac Asn | ttg Leu | gca Ala 175 | aaa Lys | 528 |
| gca Ala | gct Ala | a a a Lys | gag Glu 180 | atg Met | ctt Leu | gct Ala | aat Asn | tca Ser 185 | gtt Val | aaa Lys | g a g Glu | ctt Leu | aca Thr 190 | agt Ser | cct Pro | 576 |
| | gtg Val | | | | | | | | | \ | | | | | | 582 |
| <21 <21 | 0> 2: 1> 1: 2> PI 3> Bo | 93 RT | lia 1 | burgo | dorf | eri | | | | | \ | | | | | |
| <40 Thr | 0> 2: Leu | 2 Phe | Leu | Phe | Ile | Ser | Cys | Asn | Asn | Ser | Gly | Lys | Asp | Gly | Asn | |
| 1 | | | Asn 20 | 5 | | | | | 10 | | | \ | | 15 | | |

Glu Ile Set Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val 35 Lys Glu Ile \Glu Thr Leu Leu Ala Ser Ile Asp Glu Leu Ala Thr Lys Ala Ile Gly L\vs Lys Ile Gln Gln Asn Gly Gly Leu Ala Val Glu Ala Gly His Asn Gly Thr Leu Leu Ala Gly Ala Tyr Thr Ile Ser Lys Leu Ile Thr Gln Lys Leu Asp Gly Leu Lys Asn Ser Glu Lys Leu Lys Glu 105 100 Lys Ile Glu Asn Ala Lys Lys Cys Ser Glu Asp Phe Thr Lys Lys Leu 120 Glu Gly Glu His Ala Gln Leu Gly Ile Glu Asn Val Thr Asp Glu Asn 135 Ala Lys Lys Ala Ile\Leu Ile Thr Asp Ala Ala Lys Asp Lys Gly Ala 150 Ala Glu Leu Glu Lys Neu Phe Lys Ala Val Glu Asn Leu Ala Lys Ala 170 165 Ala Lys Glu Met Leu Ala Asn Ser Val Lys Glu Leu Thr Ser Pro Ile Val

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Met Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser
1 10 15

gct gat gag tct gtt aaa ggg cct aat ctt aca gaa ata agt aaa aaa 96
Ala Asp Glu Ser Val Lys Gly Pro Asn leu Thr Glu Ile Ser Lys Lys
20 25 30

att acg gat tct aat gcg gtt tta ctt gct gtg aaa gag gtt gaa gcg 144

Ile Thr Asp Ser Asn Ala Val Leu Leu Ala

Val Lys Glu Val Glu Ala

35 40 45

ttg ctg tca tct ata gat gaa att gct gct aaa gct att ggt aaa aaa 192 Leu Leu Ser Ser Ile Asp Glu Ile Ala Ala Lys Ala Ile Gly Lys Lys 50 55 60

ata cac caa aat aat ggt ttg gat acc gaa tat aat cac aat gga tca 240
Ile His Gln Asn Asn Gly Leu Asp Thr Glu Tyr Asn His Asn Gly Ser
65 70 75 80

| | \ | | | | | | | | | | | | | | |
|-------------------|---|--|--|--|--|---|---|---|--|--|---|---|---|---|---|
| tta Leu | gcq Ala | gga Gly | gct Ala 85 | tat Tyr | gca Ala | ata Ile | tca Ser | acc Thr 90 | cta Leu | ata Ile | aaa Lys | caa Gln | aaa Lys 95 | tta Leu | 288 |
| gga Gly | ttg Leu | aaa Lys 100 | aat Asn | gaa Glu | gga Gly | tta Leu | aag Lys 105 | gaa Glu | aaa Lys | att Ile | gat Asp | gcg Ala 110 | gct Ala | aag Lys | 336 |
| tgt Cys | tct Ser 115 | gaa Glu | aca Thr | ttt Phe | act Thr | aat Asn 120 | aaa Lys | tta Leu | aaa Lys | gaa Glu | aaa Lys 125 | cac His | aca Thr | gat Asp | 384 |
| ggt Gly 130 | aaa Lys | gaa Glu | ggt Gly | \gtt Val | act Thr 135 | gat Asp | gct Ala | gat Asp | gca Ala | aaa Lys 140 | gaa Glu | gcc Ala | att Ile | tta Leu | 432 |
| aca Thr | aat Asn | ggt Gly | act Thr | aaa Lys 150 | act Thr | aaa Lys | ggt Gly | gct Ala | gaa Glu 155 | gaa Glu | ctt Leu | gga Gly | aaa Lys | tta Leu 160 | 480 |
| gaa Glu | tca Ser | gta Val | gag Glu 165 | gtc Val | ttg Leu | tca Ser | aaa Lys | gca Ala 170 | gct Ala | aaa Lys | gag Glu | atg Met | ctt Leu 175 | gct Ala | 528 |
| tca Ser | gtt Val | aaa Lys 180 | gag Glu | ctt Leu | aca Thr | agc Ser | cct Pro 185 | gtt Val | gtg Val | gca Ala | gaa Glu | agt Ser 190 | cca Pro | gcc Ala | 576 |
| gta Val | aat Asn 195 | aat Asn | tca Ser | ggg Gly | aa a Lys | gat Asp 200 | ggg Gly | aat Asn | aca Thr | tct Ser | gca Ala 205 | aat Asn | tct Ser | gct Ala | 624 |
| Glu | Ser | gtt Val | aaa Lys | ggg Gly | cct Pro 215 | aat Asn | ctt Leu | aca Thr | gaa Glu | ata Ile 220 | agt Ser | aaa Lys | aaa Lys | att Ile | 672 |
| Glu | tct Ser | aac Asn | gca Ala | gtt Val 230 | gtt Val | ctc Leu | gcc Ala | gtg Val | гАг | GIU | gtt Val | ga a Glu | act Thr | ttg Leu 240 | 720 |
| aca Thr | tct Ser | ata Ile | Asp | Glu | ctt Leu | gct Ala | a aa Lys | Ala | / тте | ggt Gly | aaa Lys | aaa Lys | TTe | a a a Lys | 768 |
| gat Asp | gtt Val | Ser | Leu | gat Asp | aat Asn | gag Glu | АТа | Asp | dac | aac Asn | gga Gly | Ser | ьeu | ata Ile | 816 |
| gga Gly | Ala | Tyr | tta Leu | att Ile | tca Ser | Asn | Leu | ata Ile | aca Thr | aaa : Lys | aaa Lys 285 | ata Ile | agt Ser | gca Ala | 864 |
| e Lys | Asp | tca Ser | gga Gly | ı gaa ⁄Glu | Leu | Lys | gca Ala | gaa Glu | att ı Ile | e Glu | ı ү гүs | gct Ala | aag Lys | aaa Lys | 912 |
| s Ser | gaa Glu | ı gaa ı Glu | a ttt ı Ph∈ | Thr | : Ala | aaa Lys | tta Leu | a aaa 1 Lys | 3 GT? | / GIU | cac His | Thr | gat Asp | ctt Leu 320 | 960 |
| | gga gly tgts ggly 130 aca Thr gaa Glu tca Ser gtal ggagu 210 gaau aca Thr gath ggagu 220 aca Elys | gga ttg Gly Leu tgt tct Cys Ser 115 ggt aaa Gly Lys 130 aca aat Thr Asn gaa tca Glu Ser tca gtt Ser Val gta Aat Val Asn 195 gag tct 210 gaa tct Thr Ser aca tct Thr Ser gat gtt Asp Val agga gca c Gly Ala c Gl | gga ttg aaa Gly Leu Lys 100 tgt tct gaa gaa Gly Lys Glu 115 ggt aaa gaa gaa Gly Lys Glu 130 aca aat ggt Thr Asn Gly gaa tca gta Glu Ser Val Lys 180 gta aat aat Val Asn Asn 195 gag tct gtt Glu Ser Val 210 gaa tct aac Glu Ser Asn 195 gag tct gtt Glu Ser Asn 195 gag tct gtt agt 210 gaa tct aac 5 Glu Ser Asn 195 aca tct ata 5 Gly Ala Tyr 275 a aaa gat tca 290 a tct gaa gaa gaa ser Gly Ala Tyr 275 a aaa gat tca 35 Ser Glu Glu | Leu Ala Gly Ala 85 gga ttg aaa aat Gly Leu Lys Asn 100 tgt tct gaa ca Cys Ser Glu Thr 115 ggt aaa gaa ggt Gly Lys Glu Gly 130 aca aat ggt act Thr Asn Gly Thr gaa tca gta gag Glu Ser Val Glu 165 tca gtt aaa gag Ser Val Lys Glu 180 gta aat aat tca Val Asn Asn Ser 195 gag tct gtt aaa Glu Ser Val Lys 210 gaa tct aac gca Glu Ser Asn Ala aca tct ata gat Thr Ser Ile Asp 245 gat gtt agt tta Asp Val Ser 260 a gga gca tat tta Gly Ala Tyr Leu 275 aaa gat tca gga tct gaa gaa ttt Ser Glu Glu Phe | gga ttg aaa aat gaa Gly Leu Lys Asn Glu 100 tgt tct gaa aca ttt Cys Ser Glu Thr Phe 115 ggt aaa gaa ggt gtt Gly Lys Glu Gly Val 130 aca aat ggt act aaa Thr Asn Gly Thr Lys 150 gaa tca gta gag gtc Glu Ser Val Glu Val 165 tca gtt aaa gag ctt Ser Val Lys Glu Leu 180 gta aat aat tca ggg Val Asn Asn Ser Gly 195 gag tct gtt aaa ggg tct Glu Ser Val Lys Glu Leu 180 gaa tct aac gca gtt Asn Ala Val 230 gaa tct ata gat gag Glu Ser Val Lys Gly 210 gaa tct ata gat gag gtc Glu Ser Val Lys Gly 210 gaa tct ata gat gag gtc Glu Ser Asn Ala Val 230 aca tct ata gat gag gtc Gly Ala Tyr Leu Ile 275 aaa gat tca gga gaa ttt act gat Ser Glu Glu Phe Thr | gga ttg aaa aat gaa gga Gly Leu Lys Asn Glu Gly 100 tgt tct gaa aca ttt act Cys Ser Glu Thr Phe Thr 115 ggt aaa gaa ggt gtt act Gly Lys Glu Gly Val Thr 130 gaa tca gta gag gtc ttg Glu Ser Val Glu Val Leu 165 tca gtt aaa gag ctt aca Ser Val Lys Glu Leu Thr 180 gta aat aat tca ggg aaa Val Asn Asn Ser Gly Lys 195 gag tct gtt aaa ggg ctt Glu Ser Val Lys Gly Pro 210 gaa tct aac gca gtt gtt Glu Ser Val Lys Gly Pro 210 gaa tct aac gca gt gtt Glu Ser Asn Ala Val 230 aca tct ata gat gag ctt Glu Ser Leu Asp Asn 260 gga gca tat tta gat aat Asp Val Ser Leu Asp Asn 260 a gga gca tat tta att tca Gly Ala Tyr Leu Ile Ser 275 a aaa gat tca gga gaa ttg 290 c tct gaa gaa ttt act gct Ser Glu Glu Phe Thr Ala | gga ttg aaa aat gaa gga tta Gly Leu Lya Asn Glu Gly Leu 1000 tgt tct gaa aca ttt act aat Cys Ser Glu Thr Phe Thr Asn 115 120 ggt aaa gaa ggt gtt act gat Gly Lys Glu Gly Val Thr Asp 130 aca aat ggt act aaa act aaa Thr Asn Gly Thr Lys 150 gaa tca gta gag gtc ttg tca Glu Ser Val Glu Val Leu Ser 165 tca gtt aaa gag ctt aca agc Ser Val Lys Glu Leu Thr Ser 180 gta aat aat tca ggg aaa gat Val Asn Asn Ser Gly Lys Asp 195 gag tct gtt aaa ggg cct aat Glu Ser Val Lys Gly Pro Asn 210 gaa tct aac gca gtt gtt ctc Glu Ser Asn Ala Val Val Leu 230 aca atct ata gat gag ctt gct Thr Ser Ile Asp Glu Leu Ala 245 aga gca tat tta att tca aac Gly Ala Tyr Leu Ile Ser aaa gat tca gga gaa ttg aga gca tat tta att tca aac Gly Ala Tyr Leu Ile Ser aaa gat tca gga gaa ttg aga gca tat tta att tca aac Cly Ala Tyr Leu Ile Ser Asn 275 aaaa gat tca gga gaa ttg aac Cly Ala Tyr Leu Ile Ser Asn 286 Cly Ala Tyr Leu Ile Ser Asn Clu Ser Cly Glu Phe Thr Ala Lys Cly Clu Leu Cly Clu Cly | gga ttg aaa aat gaa gga tta aag Gly Leu Lys 100 tgt tct gaa aca ttt act aat aaa Cys Ser Glu Thr Phe Thr Asn Lys 115 gga aaa gaa ggt gtt act gat gct Gly Lys Glu Gly Thr Lya Thr Lys Gly 130 aca aat ggt act aaa act aaa ggt Thr Asn Gly Thr Lya Thr Lys Gly 150 gaa tca gta gag gtc ttg tca aaa Glu Ser Val Glu Leu Thr Ser Leu Asn Leu 215 gga tct gtt aaa ggg act act aca agc cct Ser Val Lys Glu Leu Thr Ser Pro 180 gaa tct gtt aaa ggg cct act act agc ggg aat aat act tca ggg aaa gat ggg ggg aaa gat ggg ggg aaa gat ggg ggg | gga ttg aaa aat gaa gga tta aag gaa Gly Leu Lys Asn Glu Gly Leu Lys Glu 100 tgt tct gaa aca ttt act aat aaa tta Cys Ser Glu Thr Phe Thr Asn Lys Leu 120 ggt aaa gaa ggt gtt act gat gct gat Gly Lys Glu Gly Thr Lys Gly Ala Asn 135 aca aat ggt act aaa act aaa ggt gct Thr Asn Gly Thr Lys Thr Lys Gly Ala 150 gaa tca gta gag gtc ttg tca aaa gca Glu Ser Val Glu Val Leu Thr Ser Lys Ala 165 tca gtt aaa gag ctt aca agc cct gtt Ser Val Lys Glu Leu Thr Ser Pro Val 180 gta aat aat tca ggg aaa gat ggg aat Val Asn Asn Ser Gly Lys Asp Gly Asn 195 gag tct gtt aaa ggg cct aat tta aca Glu Ser Val Lys Gly Lys Asp Gly Asn 200 gag tct gtt aaa ggg ctt ttg tca aaa gdg aat Cyal Asn Asn Asn Asn Ser Gly Lys Asp Gly Asn 195 gag tct gtt aaa ggg cct aat ctt aca Glu Ser Val Lys Gly Ero Asn Leu Thr 215 gaa tct aac gca gtt gtt ctc gcc gtg Glu Ser Asn Ala Val Val Leu Ala Val 230 aca aca tct ata gat gag ctt gct aaa gdt Asp Val Ser Leu Asp Asn Glu Leu Ala Asp 245 gat gtt agt tta gat aat gag gca gat Asp Val Ser Leu Asp Asn Glu Ala Asp 260 a gga gca tat tta att tca aac tta ata 32 aag 32 aag 32 aag 32 aag 33 aag 34 aac 34 aa | gga ttg aaa aat gaa gga tta aag gaa aaa Cys Ser Glu Thr Phe Thr Asn Lys Leu Lys 115 ggt aaa gaa ggt gtt act gat gct gat gca Gly Lys 115 ggt aaa gaa ggt gtt act gat gct gat gca Gly Lys Glu Gly Lys 120 ggt aaa gaa ggt gtt act gat gct gat gca Gly Lys Glu Gly Lys Glu Gly Lys Glu Gly Lys 135 aca aat ggt act aaa act aaa ggt gct gaa act aaa act aaa ggt gct gaa tca gta gag gtc the Lys Glu Ser Val Glu Val Leu Ser Lys Ala Ala 155 gaa tca gta gag gtc ttg tca aaa gca gct Glu Ser Val Glu Leu Thr Ser Pro Val Val 180 gta aat aat tca ggg aaa ag gat ggg aat aca Val Asn Asn Ser Gly Lys Asp Gly Asn Thr 195 gag tct gtt aaa ggg cct aat ct aca agg ggg aat aca Cyal Asn Asn Ala Val Lys Asp Gly Asn Thr Glu 215 gaa tct ac gca gtt gtt ctc gcc gta gaa Glu Ser Val Lys Gly Pro Asn Deu Thr Glu 215 gaa tct act ac gca gtt gtt ctc gcc gtg aaa Cyal Asn Asn Ala Val Val Leu Ala Val Lys 230 aca act tct ata gat gag ctt gct aaa gag gca gat aca Cyal Ser Lys Asp Glu Leu Ala Cyal Val Lys Asp Glu Leu Ala Cyal Val Lys Cyal Cyal Cyal Cyal Cyal Cyal Cyal Cyal | gga ttg aaa aat gaa gga tta aaa gga aaa atta aaa gga gg | gga ttg aaa aat gaa gga tta aaa gaa aaa a | gga ttg aaa aat gaa gga tta aaa gaa aaa a | Gga ttg aaa aat gaa gga tta aag gaa aaa a | gga ttg aaa gaa gga gta tta aag gaa aaa a |

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|---|------------------------------|-------------------|-----------|--------------|---------------------|--------------------|--------------|---------------------|--------------|----------------|-------------------|------------|------------|------------|--------------------|-----------------|-------------------|---------|------------|------|
| (| ggt Gly | aaa Lys | ga Gl | a go u G | тА Л | tt a al T 25 | ct g hr A | at g .sp A | at a sp A | | gca Ala 330 | aaa Lys | aaa Lys | gc Al | c a .a I | tt le | tta Leu 335 | a: L | aa ys | 1008 |
| | aca Thr | aat Asn | aa As | sn A | at a sp I 40 | aaa a Lys T | ct a hr L | ag g ys G | TA U | ct la 45 | gat Asp | gaa Glu | ctt | ga 1 GI | aa a Lu I | ag ys 850 | tta Leu | t P | tt he | 1056 |
| | gaa Glu | tca Ser | ۷a | al L | aa a ys <i>I</i> | aac t Asn I | tg t | er 1 | aa g ys A | ıca Ma | gct Ala | aaa Lys | gaq Glu | | tg d et I 65 | ctt Leu | act Thr | a A | at .sn | 1104 |
| | tca Ser | gtt Val 370 | Ly | aa g ys G | ag (| ctt a Leu : | i'nr\ | agc t Ser 375 | aa * | | | | | | | | | | | 1128 |
| | <210 <211 <211 <211 | 1> 3 2> E | 74 RT | ific | cial | Seq | uenc | e | | | | | | | | | | | | |
| | <22 <22 | | Osp | C CI | nime | ra | | ' | | | | | | | | | | | | |
| | <40 Ala | 0> : Су: | 24 s A | sn i | Asn | Ser 5 | Gly | Lys | Asb | Gly | Asn 10 | Thi | r Se | r F | Ala | Asn | Se 15 | r | Ala | |
| | Asp | Gl | u S | er ' | Val | 5 Lys | Gly | Pro | Asn | Leu 25 | Thr | Glı | ı Il | .e S | Ser | Lys 30 | : ГА | S | 11e | |
| | | | | Ser | | Ala | | | | Ala | | | | | | | | | | |
| | | | r S | | | Asp | | | Ala | | | | | | | | | | | |
| | | | | | | Gly | | | | | | | | | | | | | | |
| | 65 Let | ı Al | a (| Gly | Ala | Tyr | 70 Ala | Ile | Ser | Thr | Leu | ı Il | e L | ys (| Gln | Lys | s Le 95 | eu 5 | Asp | |
| | Gly | y Le | u l | Ĺуs | Asn | 85 Glu | Gly | Leu | Lys | Glu | LY | s Il | e A | sp. | Ala | Ala 11 | a Ly | /S | Lys | |
| | Cys | s Se | er (| Glu | 100 Thr | Phe | Thr | Asn | Lys | 105 Leu | Ly | G1 | u L | ys | His 125 | Th | r As | sp | Leu | |
| | | | | | | Val | | Asp | | | | | s G | | | | | | | |
| | | | | | | Lys | | | | | | u G | u L | | | | | | | |
| | | | | | | Val | | | | | a Al | a Ĺ | | | | | | | | |
| | | | | | | 165 Leu | | | | Va. | l Va | | | | | | | | | |
| | | | | | |) Gly | | | | | | | | | Asn | Se | | | | |
| | | | | | | Gly | | | | | | | le S | er\ | | | | | | |
| | | | | | | | | | | | | s G | lu V | | | | | | Leu 240 | |
| | | | | | | | Leu Leu | | | | | e G | | | | | le I | | Asn | |
| | | | | | | | | | | | | | | | | \ | | | | |

19/102 Asp Val Ser Leu Asp Asn Glu Ala Asp His Asn Gly Ser Leu Ile Ser Gly Ala Tyr Leu Ile Ser Asn Leu Ile Thr Lys Lys Ile Ser Ala Ile Lys Asp Ser Gl Glu Leu Lys Ala Glu Ile Glu Lys Ala Lys Lys Cys Thr Ala Lys Leu Lys Gly Glu His Thr Asp Leu Gly 290 Lys Glu Gly Val Thr Asp Asp Asn Ala Lys Lys Ala Ile Leu Lys Thr Asn Asn Asp Lys Thr Lys Gly Ala Asp Glu Leu Glu Lys Leu Phe Glu Ser Val Lys Asn Leu Ser Lys Ala Ala Lys Glu Met Leu Thr Asn Ser 355 Val Lys Glu Leu Thr Ser 370 <210> 25 <211> 1124 <212> DNA <213> Artificial Sequence <223> OspC Chimera <221> CDS <222> (1)...(1124) atg gct tgt aat aat tca ggg aaa gat ggg aat aca tct gca aat tct Met Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser gct gat gag tct gtt aaa ggg cct aat ctt aca gaa ata agt aaa aaa Ala Asp Glu Ser Val Lys Gly Pro Asn Jeu Thr Glu Ile Ser Lys Lys 96 att acg gat tct aat gcg gtt tta ctt gct gtg aaa gag gtt gaa gcg Ile Thr Asp Ser Asn Ala Val Leu Ala Val Lys Glu Val Glu Ala ttg ctg tca tct ata gat gaa att gct gct aaa gct att ggt aaa aaa 192 Leu Leu Ser Ser Ile Asp Glu Ile Ala Ala Lys Ala Ile Gly Lys Lys ata cac caa aat aat ggt ttg gat acc gaa tat aat cac aat gga tca 240 Ile His Gln Asn Asn Gly Leu Asp Thr Glu Tyr Asn His Asn Gly Ser ttg tta gcg gga gct tat gca ata tca acc cta ata aaa caa aaa tta 288 Leu Leu Ala Gly Ala Tyr Ala Ile Ser Thr Leu Ile Lys Gln Lys Leu Asp Gly Leu Lys Asn Glu Gly Leu Lys Glu Lys Ile Asp Ala Ala Lys

| 20/102 | |
|--|------|
| aaa tgt tct gaa aca ttt act aat aaa tta aaa gaa aaa cac aca gat 384 Lys Cys Ser Glu Thr Phe Thr Asn Lys Leu Lys Glu Lys His Thr Asp 120 125 | |
| ctt ggt aaa gaa ggt gtt act gat gct gat gca aaa gaa gcc att tta 432 Leu Gly Lys Glu Gly Val Thr Asp Ala Asp Ala Lys Glu Ala Ile Leu 130 135 | |
| aaa aca aat ggt act aaa act aaa ggt gct gaa gaa ctt gga aaa tta 480 Lys Thr Asn Gly Thr Lys Thr Lys Gly Ala Glu Glu Leu Gly Lys Leu 150 155 | |
| ttt gaa tca gta gag gtc ttg tca aaa gca gct aaa gag atg ctt gct 528 Phe Glu Ser Val Glu Val Leu Ser Lys Ala Ala Lys Glu Met Leu Ala 175. | |
| aat tca gtt aaa gag ctt aca agc cct gtt gtg gca gaa agt cca gcc 576 aat tca gtt aaa gag ctt aca agc cct gtt gtg gca gaa agt cca gcc 576 Asn Ser Val Lys Glu Leu Thr Ser Pro Val Val Ala Glu Ser Pro Ala 180 180 | i |
| atg gta aat aat tca gga aaa gat ggg aat aca tct gca aat tct gct atg gta aat aat tca gga aaa gat ggg aat aca tct gca aat tct gct atg gta aat aat tca gga aaa gat ggg aat aca tct gca aat tct gct atg gta aat aca tct gca aat tct gct atg gta aat aca tct gca aat tct gct atg gta aat aca tct gca aat tct gct atg gta aat aca tct gca aat tct gct atg gta aat aca tct gca aat tct gct atg gta aat aca tct gca aat tct gct atg gta aat aca tct gca aat tct gct atg gta aat aca tct gca aat tct gct atg gta aat aca tct gca aat tct gct atg gta aat aca tct gca aat tct gct atg gta aat aca tct gca aat tct gct atg gta aat aca tct gca aat tct gct atg gta aat aca tct gca aat tct gct atg gta aat aca tct gca aat tct gct atg gta aat aca tct gca aat tct gct atg gta aat aca tct gca aat tct gct atg gta aat aca tct gca aat tct gct atg gta aat aca tct gca aat aca tct gca aat tct gca aca gca gca gca gca gca gca gca gca | 1 |
| gat gag tct gtt aaa ggg cct aat ctt aca gaa ata agt aaa aaa att 673 gat gag tct gtt aaa ggg cct aat ctt aca gaa ata agt aaa aaa att 673 Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile 220 | 2 |
| aca gaa tct aac gca gtt gtt ctg gct gtg aaa gaa att gaa act ttg 72 aca gaa tct aac gca gtt gtt ctg gct gtg aaa gaa att gaa act ttg 72 Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Ile Glu Thr Leu 230 230 240 | 0 |
| ctt gca tct ata gat gaa ctt gct act aaa gct att ggt aaa aaa ata 76 ctt gca tct ata gat gaa ctt gct act aaa gct att ggt aaa aaa ata 76 Leu Ala Ser Ile Asp Glu Leu Ala Thr Lys Ala Ile Gly Lys Lys Ile 245 245 | 8 |
| caa caa aat ggt ggt tta gct gtc gaa gcg ggg cat aat gga aca ttg Caa caa aat ggt ggt tta gct gtc gaa gcg ggg cat aat gga aca ttg Cab Caa Caa aat ggt ggt tta gct gtc gaa gcg ggg cat aat gga aca ttg Cab Caa Caa aat ggt ggt tta gct gtc gaa gcg ggg cat aat gga aca ttg Cab Caa Caa Caa aat ggt ggt tta gct gtc gaa gcg ggg cat aat gga aca ttg Caa Caa Caa aat ggt ggt tta gct gtc gaa gcg ggg cat aat gga aca ttg Caa Caa Caa Caa aat ggt ggt tta gct gtc gaa gcg ggg cat aat gga aca ttg Caa Caa Caa Caa aat ggt ggt tta gct gtc gaa gcg ggg cat aat gga aca ttg Caa Caa Caa Caa aat ggt ggt tta gct gtc gaa gcg ggg cat aat gga aca ttg Caa | L6 |
| tta gca ggt gct tat aca ata tca aaa cta ata aca caa aaa tta gat 8000 | 64 |
| gga ttg aaa aat tca gaa aaa tta aag gaa aat gaa aat gaa aat goo aag gaa ttg aaa att gaa aat goo aag gaa aat gaa aat goo aag gaa aat goo aag gaa aat goo aag gaa aat goo aag gaa aat goo aag gaa aat ga | 12 |
| aaa tgt tct gaa gat ttt act aaa aaa cta gaa gga gaa cat geg cad Lys Cys Ser Glu Asp Phe Thr Lys Lys Leu Glu Gly Glu His Ala Gln 320 | 960 |
| | 1008 |
| ata aca gat gca gct aaa gat aag ggc gct gca gag ctt gaa aag cta Ile Thr Asp Ala Ala Lys Asp Lys Gly Ala Ala Glu Leu Glu Lys Leu 350 | 1056 |
| | |

TENETT STATES

ttt aaa gca gta gaa aac ttg gca aaa gca gct aaa gag atg ctt gct 1104 Phe Lys Ála Val Glu\Asn Leu Ála Lys Ála Ála Lys Glu Met Leu Ála 360 355 1124 aat tca gtt aaa gag cat ac Asn Ser Val Lys Glu Le 370 <210> 26 <211> 373 <212> PRT <213> Artificial Sequence <220> <223> OspC Chimera Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser Ala · <400> 26 Asp Glu Ser Val Lys Gly Pro Ash Leu Thr Glu Ile Ser Lys Lys Ile 25 Thr Asp Ser Asn Ala Val Leu Leu Ala Val Lys Glu Val Glu Ala Leu 40 Leu Ser Ser Ile Asp Glu Ile Ala Ala Lys Ala Ile Gly Lys Lys Ile His Gln Asn Asn Gly Leu Asp Thr Glu Tyr Asn His Asn Gly Ser Leu 55 Leu Ala Gly Ala Tyr Ala Ile Ser Thr Leu Ile Lys Gln Lys Leu Asp Gly Leu Lys Asn Glu Gly Leu Lys Glu Lys Ile Asp Ala Ala Lys Lys Cys Ser Glu Thr Phe Thr Asn Lys Leu Lys Glu Lys His Thr Asp Leu 120 Gly Lys Glu Gly Val Thr Asp Ala Asp Ala Lys Glu Ala Ile Leu Lys 135 Thr Asn Gly Thr Lys Thr Lys Gly Ala Glu Glu Leu Gly Lys Leu Phe Glu Ser Val Glu Val Leu Ser Lys Ala Ala Lys Glu Met Leu Ala Asn 150 170 Ser Val Lys Glu Leu Thr Ser Pro Val Val Ala Glu Ser Pro Ala Met Val Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser\Ala Asn Ser Ala Asp 185 200 Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Ile Glu Thr Leu Leu 215 Ala Ser Ile Asp Glu Leu Ala Thr Lys Ala Ile Gly Lys Lys Ile Gln 230 Gln Asn Gly Gly Leu Ala Val Glu Ala Gly His Asn Cly Thr Leu Leu ²⁶⁵ Ala Gly Ala Tyr Thr Ile Ser Lys Leu Ile Thr Gln Lys Leu Asp Gly Leu Lys Asn Ser Glu Lys Leu Lys Glu Lys Ile Glu Asn Ala Lys Lys 280 Cys Ser Glu Asp Phe Thr Lys Lys Leu Glu Gly Glu His Ala Gln Leu

Gly Ile Glu Ash Val Thr Asp Glu Asn Ala Lys Lys Ala Ile Leu Ile 330 325 Thr Asp Ala Ala Lys Asp Lys Gly Ala Ala Glu Leu Glu Lys Leu Phe 350 345 340 Lys Ala Val Glu Akn Leu Ala Lys Ala Ala Lys Glu Met Leu Ala Asn 360 Ser Val Lys Glu Let 370 <210> 27 <211> 1137 <212> DNA <213> Artificial Sequence <220> <223> OspC Chimera <221> CDS <222> (1)...(1137) atg gct tgt aat aat tca ggg $ar{a}$ aaa gat ggg aat aca tct gca aat tct Met Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser gct gat gag tct gtt aaa ggg cct aat ctt aca gaa ata aat aaa aaa Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Asn Lys Lys att acg gat tct aat gcg gtt tta ttt gct gtg aaa gag gtt gaa gcg Ile Thr Ásp Ser Asn Ála Val Leu Leu Ala Val Lys Glu Val Glu Ála ttg ctg tca tct ata gat gaa att gct gct aaa gct att ggt aaa aaa Leu Leu Ser Ser Ile Asp Glu Ile Ala\Ala Lys Ala Ile Gly Lys Lys ata cac caa aat aat ggt ttg gat acc ga aat aat cac aat gga tca 240 Ile His Gln Asn Asn Gly Leu Asp Thr Glu Asn Asn His Asn Gly Ser ttg tta gcg gga gct tat gca ata tca acc \cta ata aaa caa aaa tta 288 Leu Leu Ala Gly Ala Tyr Ala Ile Ser Thr Leu Ile Lys Gln Lys Leu gat gga ttg aaa aat gaa gga tta aag gaa aa a att gat gcg gct aag 336 Āsp Gly Leu Lys Asn Glu Gly Leu Lys Glu Lya Ile Asp Ala Ala Lys 100 aaa tgt tct gaa aca ttt act aat aaa tta aaa qaa aaa cac aca gat 384 Lys Cys Ser Glu Thr Phe Thr Asn Lys Leu Lys Alu Lys His Thr Asp 115 ctt ggt aaa gaa ggt gtt act gat gct gat gca aaa gaa gcc att tta Leu Gly Lys Glu Gly Val Thr Ásp Ála Ásp Ála Lys Glu Ála Ile Leu

| | | | \ | | | | | | 23/1 | 02 | | | | | | |
|-------------------|-----------------------|--------------------|--------------------|-----------------------|-------------------|--|---------------------|-------------------|--------------------|-----------------------|-------------------|-----------------------|--------------------|--------------------|-----------------------|------|
| aaa Lys 145 | gca Ala | aat Asn | Gly | act Thr | aaa Lys 150 | act Thr | aaa Lys | ggt Gly | gct Ala | gaa Glu 155 | gaa Glu | ctt Leu | gga Gly | aaa Lys | tta Leu 160 | 480 |
| ttt Phe | gaa Glu | tca Ser | gta Val | 929 Glu 165 | gtc Val | ttg Leu | tca Ser | aaa Lys | gca Ala 170 | gct Ala | aaa Lys | gag Glu | atg Met | ctt Leu 175 | gct Ala | 528 |
| aat Asn | tca Ser | gtt Val | aaa Lys 180 | gag\ Glu | ctt Leu | aca Thr | agc Ser | cct Pro 185 | gtt Val | gtg Val | gca Ala | gaa Glu | agt Ser 190 | cca Pro | aaa Lys | 576 |
| aaa Lys | cct Pro | tcc Ser 195 | atg Met | gta Val | aat Asn | aat Asn | tca Ser 200 | ggg Gly | aaa Lys | gat Asp | ggg Gly | aat Asn 205 | aca Thr | tct Ser | gca Ala | 624 |
| aat Asn | tct Ser 210 | gct Ala | gat Asp | gag Glu | tct | gtt Val 215 | aaa Lys | ggg Gly | cct Pro | aat Asn | ctt Leu 220 | | gaa Glu | ata Ile | agt Ser | 672 |
| aaa Lys 225 | Lys | att Ile | aca Thr | gaa Glu | tct Ser 230 | aac Asn | gca Ala | gtt Val | gtt Val | ctc Leu 235 | gcc Ala | gtg Val | aaa Lys | gaa Glu | gtt Val 240 | 720 |
| gaa Glu | act Thr | ttg Leu | ctt Leu | aca Thr 245 | tct Ser | ata Ile | gat Asp | gag Glu | ctt Leu 250 | мта | aaa Lys | gct Ala | att Ile | ggt Gly 255 | -1 | 768 |
| aaa Lys | ata Ile | aaa Lys | aac Asn 260 | gat Asp | gtt Val | agt Ser | tta Leu | gat Asp 265 | ASI | gag Glu | gca Ala | a gat a Asp | cac His 270 | | gga Gly | 816 |
| tca | tta Lev | ata 1116 275 | e Ser | gga Gly | gca Ala | tat Tyr | tta Leu 280 | 1/116 | tca Ser | a aac Asr | tta Lei | a ata ı Ile 285 | | a aaa C Lys | aaa Lys | 864 |
| ata | a agt e Sei 290 | : Ala | a ata a Ile | a aaa e Lys | gat Asp | tca Ser 295 | . Сту | gaa Glu | tto Lei | g aaq ı Lys | g gca 30 | 2 01 | a att ı Ile | gaa e Glu | a aag 1 Lys | 912 |
| gct Ala | a Lys | g aaa s Ly: | a tgt s Cys | t tct s Ser | gaa Glu 310 | ı GIT | a ttt a Ph∈ | act Thi | gct Ala | t aaa a Lys 315 | э пс | a aaa u Lya | a ggt s Gly | t gaa y Glu | a cac i His 320 | 960 |
| aca Th: | a gat r Asj | t ct [.] | t gg u Gl | t aaa y Lys 325 | s Gli | a ggo ı Gly | c gtt y Val | act L Thi | t ga r As 33 | p na | t aa p As | t gc n Al | a aa a Ly | a aa s Ly 33 | a gcc s Ala 5 | 1008 |
| at: | t tt e Le | a aa u Ly | a ac s Th 34 | r Ası | t aa n Asi | t ga ¹ n As _l | t aaa p Ly: | a acts Th | т г | g\gg s Gl | c go y Al | t ga a As | t ga p Gl 35 | | t gaa u Glu | 1056 |
| aa Ly | g tt s Le | a tt u Ph 35 | e Gl | a tc u Se | a gt r Va | a aa 1 Ly | a aa s As: 36 | и те | g tc u Se | a aa r Ly | a go s Al | a go a Al 36 | ~ -1 | a ga s Gl | g atg u Met | 1104 |
| ct | t ac u Th 37 | r As | it to sn Se | a gt er Va | t aa l Ly | a ga s Gl 37 | u Le | t ac u Th | a ag r Se | c ta r * | a | | | | | 1137 |

∂210> 28 <**2**11> 378 <212> PRT <213 Artificial Sequence <220> <223> OapC Chimera <400> 28 Met Ala Cyà Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Asn Lys Lys 25 Ile Thr Asp Set Asn Ala Val Leu Leu Ala Val Lys Glu Val Glu Ala 40 Leu Leu Ser Ser tle Asp Glu Ile Ala Ala Lys Ala Ile Gly Lys Lys Ile His Gln Asn Ash Gly Leu Asp Thr Glu Asn Asn His Asn Gly Ser 75 Leu Leu Ala Gly Ala Tyr Ala Ile Ser Thr Leu Ile Lys Gln Lys Leu 85 90 Asp Gly Leu Lys Asn Glu Gly Leu Lys Glu Lys Ile Asp Ala Ala Lys 105 100 Lys Cys Ser Glu Thr Phe Thr Asn Lys Leu Lys Glu Lys His Thr Asp 120 Leu Gly Lys Glu Gly Val Thr Asp Ala Asp Ala Lys Glu Ala Ile Leu 140 13,5 Lys Ala Asn Gly Thr Lys That Lys Gly Ala Glu Glu Leu Gly Lys Leu 155 150 Phe Glu Ser Val Glu Val Leu Ser Lys Ala Ala Lys Glu Met Leu Ala 170 165 Asn Ser Val Lys Glu Leu Thr Sex Pro Val Val Ala Glu Ser Pro Lys 180 185 Lys Pro Ser Met Val Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala 200 Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser 220 215 Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Val 235 230 Glu Thr Leu Leu Thr Ser Ile Asp Glu Lau Ala Lys Ala Ile Gly Lys 250 245 Lys Ile Lys Asn Asp Val Ser Leu Asp Asn Glu Ala Asp His Asn Gly 265 Ser Leu Ile Ser Gly Ala Tyr Leu Ile Ser Asn Leu Ile Thr Lys Lys 280 Ile Ser Ala Ile Lys Asp Ser Gly Glu Leu Lys Ala Glu Ile Glu Lys 295 Ala Lys Lys Cys Ser Glu Glu Phe Thr Ala Lys Deu Lys Gly Glu His 310 315 Thr Asp Leu Gly Lys Glu Gly Val Thr Asp Asp Ash Ala Lys Lys Ala 330 325 Ile Leu Lys Thr Asn Asn Asp Lys Thr Lys Gly Ala Asp Glu Leu Glu Lys Leu Phe Glu Ser Val Lys Asn Leu Ser Lys Ala Ala Lys Glu Met Leu Thr Asn Ser Val Lys Glu Leu Thr Ser 375

| Sulphi | <210: <211: <212: <213: | > DN | 33 A | cial. | Seq | luenc | e | | | | | | | | | |
|------------------------------|----------------------------------|-------------------|-------------------|-------------------|------------------|-------------------|-------------------|-------------------|-------------------|------------------|-------------------|-------------------|-------------------|-------------------|------------------|-------------------|
| | <220 <223 | | pC C | Chime | ra | | | | | | | | | | | |
| | <221 <222 | | | (113 | 3) | | | | | | | | | | | |
| | <400 atg Met 1 | act | +at | aat Asn | aat Asn 5 | tca Ser | ggg Gly | aaa Lys | gat Asp | ggg Gly 10 | aat Asn | aca Thr | tct Ser | gca Ala | aat Asn 15 | tct Ser |
| | gct Ala | gat Asp | gag Glu | tet Ser 20 | gtt Val | aaa Lys | ggg Gly | cct Pro | aat Asn 25 | ctt Leu | aca Thr | gaa Glu | ata Ile | aat Asn 30 | aaa Lys | aaa Lys |
| | att Ile | acg Thr | gat Asp 35 | tct Ser | aat Asn | gcg Ala | gtt Val | tta Leu 40 | ctt Leu | gct Ala | gtg Val | aaa Lys | gag Glu 45 | gtt Val | gaa Glu | gcg Ala |
| | ttg Leu | ctg Leu 50 | tca Ser | tct Ser | ata Ile | gat Asp | gaa Glu 55 | att Ile | gct Ala | gct Ala | aaa Lys | gct Ala 60 | att Ile | ggt Gly | aaa Lys | aaa Lys |
| | ata Ile 65 | cac His | caa Gln | aat Asn | aat Asn | ggt Gly 70 | ttg Leu | gat Asp | acc Thr | gaa Glu | aat Asn 75 | aat Asn | cac His | aat Asn | gga Gly | tca Ser 80 |
| 7. 1. 1. | ttg Leu | tta Leu | gcg Ala | gga Gly | gct Ala 85 | tat Tyr | gda Ala | ata Ile | tca Ser | acc Thr 90 | cta Leu | ata Ile | aaa Lys | caa Gln | aaa Lys 95 | tta Leu |
| 1=4; #=1; 1=2; 1=2; | gat Asp | gga Gly | ttg Leu | aaa Lys 100 | aat Asn | gaa Glu | gga Gly | tta Leu | aag Lys 105 | gaa Glu | aaa Lys | att Ile | gat Asp | gcg Ala 110 | gct Ala | aag Lys |
| | aaa Lys | tgt Cys | tct Ser 115 | gaa Glu | aca Thr | ttt Phe | act Thr | aat Asn 120 | aaa Lys | tta Leu | aaa Lys | gaa Glu | aaa Lys 125 | cac His | aca Thr | gat Asp |
| | ctt Leu | ggt Gly 130 | aaa Lys | gaa Glu | ggt Gly | gtt Val | act Thr 135 | gat Asp | gct Ala | gat Asp | gca Ala | aaa Lys 140 | Glu | gcc Ala | att Ile | tta Leu |
| | aaa Lys 145 | gca Ala | aat Asn | ggt Gly | act Thr | aaa Lys 150 | Thr | aaa Lys | ggt Gly | gct Ala | gaa Glu 165 | gaa Glu | ctt Leu | gga Gly | aaa Lys | tta Leu 160 |

ttt gaa tca gta gag gtc ttg tca aaa gca gct aaa gag atg ctt gct Phe Glu Ser Val Glu Val Leu Ser Lys Ala Ala Lys Glu Met Leu Ala

| | | \ | | | | | | | | | | | | | | |
|-------------------|------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| aat Asn | tca Ser | gtt Val | aaa Lys 180 | gag Glu | ctt Leu | aca Thr | agc Ser | cct Pro 185 | gtt Val | gtg Val | gca Ala | gaa Glu | agt Ser 190 | cca Pro | aaa Lys | 576 |
| aaa Lys | cct Pro | tcc Ser 195 | atg Met | gta Val | aat Asn | aat Asn | tca Ser 200 | gga Gly | aaa Lys | gat Asp | ggg Gly | aat Asn 205 | aca Thr | tct Ser | gca Ala | 624 |
| aat Asn | tct Ser 210 | gct Ala | gat Asp | GJ/h 363 | tct Ser | gtt Val 215 | aaa Lys | ggg Gly | cct Pro | aat Asn | ctt Leu 220 | aca Thr | gaa Glu | ata Ile | agt Ser | 672 |
| aaa Lys 225 | aaa Lys | att Ile | aca Thr | gaa Glu | tct Ser 230 | aac Asn | gca Ala | gtt Val | gtt Val | ctg Leu 235 | gct Ala | gtg Val | aaa Lys | gaa Glu | att Ile 240 | 720 |
| gaa Glu | act Thr | ttg Leu | ctt Leu | gca Ala 245 | tct Ser | ata Tle | gat Asp | gaa Glu | ctt Leu 250 | gct Ala | act Thr | aaa Lys | gct Ala | att Ile 255 | ggt Gly | 768 |
| aaa Lys | aaa Lys | ata Ile | caa Gln 260 | caa Gln | aat Asn | ggt Gly | ggt Gly | tta Leu 265 | gct Ala | gtc Val | gaa Glu | gcg Ala | ggg Gly 270 | cat His | aat Asn | 816 |
| gga Gly | aca Thr | ttg Leu 275 | tta Leu | gca Ala | ggt Gly | gct Ala | tat Tyt 280 | aca Thr | ata Ile | tca Ser | aaa Lys | cta Leu 285 | ata Ile | aca Thr | caa Gln | 864 |
| aaa Lys | tta Leu 290 | gat Asp | gga Gly | ttg Leu | aaa Lys | aat Asn 295 | tca Ser | gaa Glu | aaa Lys | tta Leu | aag Lys 300 | gaa Glu | aaa Lys | att Ile | gaa Glu | 912 |
| aat Asn 305 | gct Ala | aag Lys | aaa Lys | tgt Cys | tct Ser 310 | gaa Glu | gat Asp | ttt Phe | act Thr | aaa Lys 315 | aaa Lys | cta Leu | gaa Glu | gga Gly | gaa Glu 320 | 960 |
| cat His | gcg Ala | caa Gln | ctt Leu | gga Gly 325 | att Ile | gaa Glu | aat Asn | gtt Val | act Thr 330 | gat Asp | gag Glu | aat Asn | gca Ala | aaa Lys 335 | aaa Lys | 1008 |
| gct Ala | att Ile | tta Leu | ata Ile 340 | aca Thr | gat Asp | gca Ala | gct Ala | aaa Lys 345 | gat Asp | aag Lys | ggc Gly | gct Ala | gca Ala 350 | Glu | ctt Leu | 1056 |
| gaa Glu | aag Lys | cta Leu 355 | ttt Phe | aaa Lys | gca Ala | gta Val | gaa Glu 360 | Asn | ttg Leu | gca Ala | aaa Lys | gca Ala 365 | gct Ala | aaa Lys | gag Glu | 1104 |
| atg Met | ctt Leu 370 | gct Ala | aat Asn | tca Ser | gtt Val | aaa Lys 375 | Glu | ctt Leu | ac | | · | | | | | 1133 |
| <21 <21 | 0> 3 1> 3 2> P 3> A | 77 R T | icia | l Se | quen | ce | | | | | | \ | | | | |

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| | | | | | | | | : | 28/1 | 02 | | | | | | |
|---------------------------|--------------------|-------------------|----------------------|-------------------|-------------------|-------------------|--------------------|--------------------|--------------------|--------------------|-----------------------|--------------------|--------------------|--------------------|-----------------------|-----|
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| <221> <222> | (f) | (| 1112 | 2) | | | | | | | | | | | | |
| <400> atg go Met Al | | gt a ys F | at a Asn <i>l</i> | aat t Asn S | ca (Ser (| ggg Gly | aaa Lys | gat Asp | ggg Gly 10 | aat Asn | aca Thr | tct Ser | gca Ala | aat Asn 15 | tct Ser | 48 |
| gct ga Ala As | at g sp G | ag t lu S | Set 20 | gtt a Val 1 | aaa Lys | ggg Gly | cct Pro | aat Asn 25 | ctt Leu | aca Thr | gaa Glu | ata Ile | agt Ser 30 | aaa Lys | aaa Lys | 96 |
| att ac Ile T | hr A | at sp 35 | tct Ser | aat Asn | gcg Ala | gtt Val | tta Leu 40 | ctt Leu | gct Ala | gtg Val | aaa Lys | gag Glu 45 | gtt Val | gaa Glu | gcg Ala | 144 |
| ttg c Leu L | tg t eu S 50 | ca Ser | tct Ser | ata Ile | gat Asp | gag Glu 55 | ctt Leu | gct Ala | aaa Lys | gct Ala | att Ile 60 | ggt Gly | aaa Lys | aaa Lys | ata Ile | 192 |
| aaa a Lys A 65 | | gat Asp | ggt Gly | agt Ser | tta Leu 70 | gat Asp | aat Asn | gaa Glu | gca Ala | aat Asn 75 | cgc Arg | aac Asn | gag Glu | tca Ser | ttg Leu 80 | 240 |
| tta g Leu A | jca (| gga Gly | gct Ala | tat Tyr 85 | aca Thr | ata Ile | tca Ser | acc Thr | tta Leu 90 | | aca Thr | caa Gln | aaa Lys | tta Leu 95 | agt Ser | 288 |
| aaa t Lys I | ta a Leu A | aac Asn | gga Gly 100 | tca Ser | gaa Glu | ggt Gly | tta Leu | aag Lys 105 | GIU | aag Lys | att Ile | gcc Ala | gca Ala 110 | gct Ala | aag Lys | 336 |
| aaa t Lys (| Cys | tct Ser 115 | gaa Glu | gag Glu | ttt Phe | agt Ser | act Thr 120 | пЛа | cta Lev | a aaa 1 Lys | gat Asp | aat Asn 125 | | gca Ala | cag Gln | 384 |
| | ggt Gly 130 | ata Ile | cag Gln | ggc Gly | gtt Val | act Thr 135 | ASP | gaa Glu | a aat 1 Asy | gca n Ala | a aaa a Lys 140 | 1 | gct Ala | t att a Ile | tta e Leu | 432 |
| aaa Lys 145 | gca Ala | aat Asn | gca Ala | gcg Ala | ggt Gly 150 | лy | gat Asp | aaq Ly: | g gg s Gl | c 9t y Va 15 | | a gaa u Glu | a ct [.] | t gaa u Gli | a aag u Lys 160 | 480 |
| ttg Leu | tcc Ser | gga Gly | tca Ser | tta Leu 165 | GIU | a ago 1 Sei | c tta c Lei | a tc ı Se | a aa r Ly 17 | | a gc a Al | t aaa a Lya | a ga s Gl | g at u Me 17 | g ctt t Leu 5 | 528 |
| gct Ala | aat Asn | tca Ser | gtt Val | l Lys | gaq Glu | g cti u Lei | t aca u Thi | a ag r Se 18 | T 1 T | t gt o Va | t gt 1 Va | c ca Hi | t gg s Gl 19 | - | t aat n Asn | 576 |
| tca Ser | aga Arg | aaa Lys 195 | s As | t ggg p Gly | g aat y Asi | t gc n Al | a tc a Se 20 | T 11: | a aa ir As | at to sn S∈ | t go er Al | c ga a As 20 | ٠, | ig to .u Se | t gtt r Val | 624 |

aaa ggg cct aat ctt aca gaa ata agt aaa aat aca gaa tct aac Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn 672 215 210 gca gtt gt ctg gcc gtg aaa gaa gtt gag acc tta ctt gca tct ata Ala Val Val Leu Ala Val Lys Glu Val Glu Thr Leu Leu Ala Ser Ile 230 gat gaa ctt gct acc aaa gct att ggt aag aaa ata ggc aat aat ggt 768 Āsp Glu Leu Āla Thr Lys Āla Ile Gly Lys Lys Ile Gly Asn Asn Gly 245 tta gag gcc aat cag agt aaa aac aca tca ttg tta tca gga gct tat 816 Leu Glu Ala Asn An Ser Lys Asn Thr Ser Leu Leu Ser Gly Ala Tyr 265 260 gca ata tct gac cta ata gca gaa aaa tta aat gta ttg aaa aat gaa 864 Ala Ile Ser Asp Leu\Ile Ala Glu Lys Leu Asn Val Leu Lys Asn Glu 280 gaa tta aag gaa aag att gat aca gct aag caa tgt tct aca gaa ttt Glu Leu Lys Glu Lys Ile Asp Thr Ala Lys Gln Cys Ser Thr Glu Phe 295 act aat aaa cta aaa agt qaa cat gca gtg ctt ggt ctg gac aat ctt 960 Thr Asn Lys Leu Lys Ser Au His Ala Val Leu Gly Leu Asp Asn Leu 310 act gat gat aat gca caa aga gct att tta aaa aaa cat gca aat aaa 1008 Thr Asp Asp Asn Ala Gln Arg\Ala Ile Leu Lys Lys His Ala Asn Lys 325 gat aag ggt gct gca gaa ctt g \dot{a} a aag tta ttt aaa gcg gta gaa aac 1056 Āsp Lys Gly Āla Āla Glu Leu Glu Lys Leu Phe Lys Āla Val Glu Asn tta tca aaa gca gct caa gac aca tta aaa aat gct gtt aaa gag ctt 1104 Leu Ser Lys Ála Ála Gln Ásp Thr Leu Lys Asn Ála Val Lys Glu Leu 360 355 1112 aca agt cc Thr Ser 370 <210> 32 <211> 369 <212> PRT <213> Artificial Sequence <220> <223> OspC Chimera Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr\Ser Ala Asn Ser Ala 10 Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Le Ser Lys Lys Ile 20

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Thr Asp Ser Asn Ala Val Leu Leu Ala Val Lys Glu Val Glu Ala Leu
                            40
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Leu Ser Ser Ile Asp Glu Leu Ala Lys Ala Ile Gly Lys Lys Ile Lys
Asn Asp Gly Ser\Leu Asp Asn Glu Ala Asn Arg Asn Glu Ser Leu Leu
                    70
Ala Gly Ala Tyr Thr Ile Ser Thr Leu Ile Thr Gln Lys Leu Ser Lys
                                    90
Leu Asn Gly Ser Gl\(\frac{1}{2}\) Gly Leu Lys Glu Lys Ile Ala Ala Lys Lys
                                105
Cys Ser Glu Glu Phe\Ser Thr Lys Leu Lys Asp Asn His Ala Gln Leu
                                                125
                            120
        115
Gly Ile Gln Gly Val Thr Asp Glu Asn Ala Lys Lys Ala Ile Leu Lys
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Ala Asn Ala Gly Lys Asp Lys Gly Val Glu Glu Leu Glu Lys Leu
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                    150
Ser Gly Ser Leu Glu Ser\Leu Ser Lys Ala Ala Lys Glu Met Leu Ala
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                165
Asn Ser Val Lys Glu Leu thr Ser Pro Val Val His Gly Asn Asn Ser
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                                185
Arg Lys Asp Gly Asn Ala Ser Thr Asn Ser Ala Asp Glu Ser Val Lys
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                            200
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Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala
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                        215
Val Val Leu Ala Val Lys Glu \Val Glu Thr Leu Leu Ala Ser Ile Asp
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                                         235
Glu Leu Ala Thr Lys Ala Ile dly Lys Lys Ile Gly Asn Asn Gly Leu
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                 245
Glu Ala Asn Gln Ser Lys Asn Thr Ser Leu Leu Ser Gly Ala Tyr Ala
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Ile Ser Asp Leu Ile Ala Glu Lys Leu Asn Val Leu Lys Asn Glu Glu
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        275
Leu Lys Glu Lys Ile Asp Thr Ala Lys Gln Cys Ser Thr Glu Phe Thr
                         295
Asn Lys Leu Lys Ser Glu His Ala Wal Leu Gly Leu Asp Asn Leu Thr
                     310
Asp Asp Asn Ala Gln Arg Ala Ile Leu Lys Lys His Ala Asn Lys Asp
                                     330
                 325
Lys Gly Ala Ala Glu Leu Glu Lys Leu Phe Lys Ala Val Glu Asn Leu
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 Ser Lys Ala Ala Gln Asp Thr Leu Lys \Asn Ala Val Lys Glu Leu Thr
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 Ser
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| atg gct tgt aat aat tca ggg aaa gat ggg aat aca tct gca aat tct 48 | | | | | | | | | | | | | | | | | |
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| | atg Met 1 | gct Ala | tgt Cys | aat Asn | aat Asn 5 | tca Ser | ggg Gly | aaa Lys | gat Asp | ggg Gly 10 | aat Asn | aca Thr | tct Ser | gca Ala | aat Asn 15 | tct Ser | 48 |
| | gct Ala | gat Asp | gag Glu | sct Ser 20 | gtt Val | aaa Lys | ggg Gly | cct Pro | aat Asn 25 | ctt Leu | aca Thr | gaa Glu | ata Ile | agt Ser 30 | aaa Lys | aaa Lys | 96 |
| | att Ile | acg Thr | gat Asp 35 | tct Ser | aat Asn | gcg Ala | gtt Val | tta Leu 40 | ctt Leu | gct Ala | gtg Val | aaa Lys | gag Glu 45 | gtt Val | gaa Glu | gcg Ala | 144 |
| | ttg Leu | ctg Leu 50 | tca Ser | tct Ser | ata Ile | gat Asp | gag Glu 55 | ctt Leu | gct Ala | aaa Lys | gct Ala | att Ile 60 | ggt Gly | aaa Lys | aaa Lys | ata Ile | 192 |
| | aaa Lys 65 | aac Asn | gat Asp | ggt Gly | agt Ser | tta Leu 70 | gat Asp | aat Asn | gaa Glu | gca Ala | aat Asn 75 | cgc Arg | aac Asn | gag Glu | tca Ser | ttg Leu 80 | 240 |
| | tta Leu | gca Ala | gga Gly | gct Ala | tat Tyr 85 | aca Thr | ata Ile | tca Ser | acc Thr | tta Leu 90 | ata Ile | aca Thr | caa Gln | aaa Lys | tta Leu 95 | agt Ser | 288 |
| | aaa Lys | tta Leu | aac Asn | gga Gly 100 | Ser | gaa Glu | ggt Gly | tta Leu | aag Lys 105 | GIU | aag Lys | att | gcc Ala | gca Ala 110 | | aag Lys | 336 |
| | aaa Lys | tgc Cys | tct Ser | : Glu | gag Glu | ttt Phe | agt Ser | act Thr 120 | тÁз | cta Leu | aaa Lys | gat Asp | aat Asn 125 | 11113 | gca Ala | cag Gln | 384 |
| | ctt Leu | ggt Gly 130 | Ile | a cag e Glr | g ggc Gly | gtt Val | act Thr 135 | Asp | gaa Glu | aat Asn | gca Ala | aaa Lys 140 | , Llys | gct Ala | att a Ile | tta Leu | 432 |
| | aaa Lys 145 | Ala | a aat a Asi | t gca n Ala | a gcç a Ala | g ggt a Gly 150 | , Lys | gat Asp | aaq Lys | g Gly | ygtt Val 155 | r GT | a gaa ı Glu | ctt Lei | gaa 1 Glu | a aag 1 Lys 160 | 480 |
| | ttç Lev | tco Sei | gg Gl | a tca y Sei | a tta r Lei 165 | ı Glı | a agc ı Ser | tta Leu | tca Sei | a aaa c Lys 170 | HI | a gct | a aaa a Lys | ı gaç s Glu | g ato 175 | ctt Leu | 528 |
| | gct Ala | aat Asi | t to n Se | a gti r Val | l Lys | a gaq s Glu | g ctt ı Lev | aca 1 Thi | a age Se: 18 | r Pro | gt: Va | t gto 1 Va | c cat l His | ggt G Gl: | y 110. | t aat n Asn | 576 |
| | tca Sei | a gg c Gl | g aa y Ly 19 | s As | t ggo p Gl | g aat y Asi | t aca n Thi | a tot Se: 200 | C AI | a aat a Ası | t tc n Se | t gc r Al | t gai a Asj 20! | . 01 | g tc u Se | t gtt r Val | . 624 |
| | aaa Ly: | a gg s Gl 21 | y Pr | t aa o As | t ct n Le | t ac u Th | a gaa r Glu 21 | יוו ג | a ag e Se | t aaa r Lya | a aa s Ly | a at s Il 22 | C 111 | ga r\Gl | a tc u Se | t aac r Asn | 672 |
| | gc Al 22 | a Va | t gt l Va | t ct il Le | c gc u Al | c gt a Va 23 | т га: | a ga s Gl | a gt u Va | t ga 1 Gl | a ac u Th 23 | | g ct u Le | t ac u Th | a tc r Se | t ata r Ile 240 | 720 |

| | | | | | | | | | | 52, | | | | | | | |
|---|-------------------|----------------------------------|-------------------|------------|------------|-------------------|------------|-------------------|------------|------------|-------------------|------------|-----------------------------|------------|------------|-------------------|------|
| | | | | | | gct Ala | | | | | | | | | | | 768 |
| | | | | | | gat Asp | | | | | | | | | | | 816 |
| | | | | | | ata Ile | | | | | | | | | | | 864 |
| | | | | | | gaa Glu | | | | | | | | | | | 912 |
| | ttt Phe 305 | act Thr | gct Ala | aaa Lys | tta Leu | aaa Lys 310 | ggt Gly | gaa Glu | cac | aca Thr | gat Asp 315 | ctt Leu | ggt Gly | aaa Lys | gaa Glu | ggc Gly 320 | 960 |
| | | | | | | gca Ala | | | | | | | | | | | 1008 |
| | | | | | | gat Asp | | | | | | | | | | | 1056 |
| | aac Asn | ttg Leu | tca Ser 355 | aaa Lys | gca Ala | gct Ala | aaa Lys | gag Glu 360 | atg Met | ctt Leu | act Thr | aat Asn | tca Ser 365 | gtt Val | aaa Lys | gag Glu | 1104 |
| | | aca Thr 370 | _ | | | | | | | \ | | | | | | | 1113 |
| | <211 <212 | 0> 34 L> 37 2> PE 3> Ar | 70 RT | icial | L Sec | quenc | ce | | | | \ | | | | | | |
| | <220 <223 |)> 3> Os | spC (| Chime | era | | | | | | | | | | | | |
| | |)> 34 Cvs | | Asn | Ser | Gly | Lvs | Asp | Glv | Asn | Thr | ger | Ala | Asn | Ser | Ala | |
| | 1 | _ | | | 5 | Gly | | _ | | 10 | | | | | 15 | | |
| | - | | | 20 | - | Val | | | 25 | | | \ | | 30 | | | |
| | Leu | | 35 Ser | Ile | Asp | Glu | | 40 Ala | Lys | Ala | Ile | ~ ~ | \ 45 l √ys | Lys | Ile | Lys | |
| | | 50 Asp | Gly | Ser | Leu | Asp | 55 Asn | Glu | Ala | Asn | | 60 Asn | Glu | Ser | Leu | | |
| \ | 65 Ala | Gly | Ala | Tyr | Thr 85 | 70 Ile | Ser | Thr | Leu | Ile 90 | 75 Thr | Gln | Lys | Leu | Ser 95 | 80 Lys | |

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                                105
Cys Ser Glu Glu Phe Ser Thr Lys Leu Lys Asp Asn His Ala Gln Leu
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Gly Ile Gln Gly Val\Thr Asp Glu Asn Ala Lys Lys Ala Ile Leu Lys
                                            140
                        135
Ala Asn Ala Ala Gly Lys Asp Lys Gly Val Glu Glu Leu Glu Lys Leu
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Ser Gly Ser Leu Glu Ser Leu Ser Lys Ala Ala Lys Glu Met Leu Ala
                                    170
                165
Asn Ser Val Lys Glu Leu\Thr Ser Pro Val Val His Gly Asn Asn Ser
                                 185
            180
Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys
                             200
Gly Pro Asn Leu Thr Glu Il Ser Lys Lys Ile Thr Glu Ser Asn Ala
                         215
Val Val Leu Ala Val Lys Glu\Val Glu Thr Leu Leu Thr Ser Ile Asp
                                         235
Glu Leu Ala Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp Val Ser Leu
                                                        - 255
                                     250
                 245
Asp Asn Glu Ala Asp His Asn Gly Ser Leu Ile Ser Gly Ala Tyr Leu
                                                     270
                                 265
Ile Ser Asn Leu Ile Thr Lys Lys\Ile Ser Ala Ile Lys Asp Ser Gly
             260
                                                 285
                             280
 Glu Leu Lys Ala Glu Ile Glu Lys Ala Lys Lys Cys Ser Glu Glu Phe
                                             300
                         295
 Thr Ala Lys Leu Lys Gly Glu His Thr Asp Leu Gly Lys Glu Gly Val
                                         315
                     310
 Thr Asp Asp Asn Ala Lys Lys Ala Ild Leu Lys Thr Asn Asn Asp Lys
                                     330
                 325
 Thr Lys Gly Ala Asp Glu Leu Glu Lys \Leu Phe Glu Ser Val Lys Asn
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 Thr Ser
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                                                                     48
 Met Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr\Ser Ala Asn Ser
  gct gat gag tct gtt aaa ggg cct aat ctt aca gaa at a agt aaa aaa
                                                                     96
  Āla Āsp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys
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| att | , | \ | +-+ | 22 + | aca | at t | tta | ctt | act | ata | aaa | gag | att | gaa | qcq | 144 |
|-------------------|-------------------|-------------------|---------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|-----------------------|-------------------|-----|
| Ile | acg Thr | Asp 35 | Ser | Asn | Ala | Val | Leu 40 | Leu | Ala | Val | Lys | Glu 45 | ν́аl | Ğlu | Åla | |
| ttg Leu | ctg Leu 50 | tca\ Ser | tct | ata Ile | gat Asp | gag Glu 55 | ctt Leu | gct Ala | aaa Lys | gct Ala | att Ile 60 | ggt Gly | aaa Lys | aaa Lys | ata Ile | 192 |
| aaa Lys 65 | aac Asn | gat Asp | G17 ggt | agt Ser | tta Leu 70 | gat Asp | aat Asn | gaa Glu | gca Ala | aat Asn 75 | cgc Arg | aac Asn | gag Glu | tca Ser | ttg Leu 80 | 240 |
| tta Leu | gca Ala | gga Gly | gct Ala | tat Tyr 85 | aca Thr | ata Ile | tca Ser | acc Thr | tta Leu 90 | ata Ile | aca Thr | caa Gln | aaa Lys | tta Leu 95 | agt Ser | 288 |
| aaa Lys | tta Leu | aac Asn | gga Gly 100 | tca Ser | gaa Glu | ggt Gly | tta Leu | aag Lys 105 | gaa Glu | aag Lys | att Ile | gcc Ala | gca Ala 110 | gct Ala | aag Lys | 336 |
| aaa Lys | tgc Cys | tct Ser 115 | gaa Glu | gag Glu | ttt Phe | agt Ser | act Thr 120 | aaa Lys | cta Leu | aaa Lys | gat Asp | aat Asn 125 | cat His | gca Ala | cag Gln | 384 |
| ctt Leu | ggt Gly 130 | ata Ile | cag Gln | ggc Gly | gtt Val | act Thr 135 | gat Asp | gaa Glu | aat Asn | gca Ala | aaa Lys 140 | aaa Lys | gct Ala | att Ile | tta Leu | 432 |
| aaa Lys 145 | gca Ala | aat Asn | gca Ala | gcg Ala | ggt Gly 150 | aaa Lys | gat Asp | aag Lys | ggc Gly | gtt Val 155 | gaa Glu | gaa Glu | ctt Leu | gaa Glu | aag Lys 160 | 480 |
| ttg Leu | tcc Ser | gga Gly | tca Ser | tta Leu 165 | gaa Glu | agc Ser | t ta Let | tca Ser | aaa Lys 170 | gca Ala | gct Ala | aaa Lys | gag Glu | atg Met 175 | пец | 528 |
| gct Ala | aat Asn | tca Ser | gtt Val 180 | Lys | gag Glu | ctt Leu | aca Thr | agc Ser 185 | cct Pro | gtt Val | gtc Val | cat His | ggt Gly 190 | ASII | aat Asn | 576 |
| tca Ser | gga Gly | aaa Lys 195 | Asp | ggg Gly | aat Asn | aca Thr | tct Ser 200 | Ala | aat Asn | tct Ser | gct Ala | gat Asp 205 | GIU | tct Ser | gtt Val | 624 |
| aaa Lys | ggg Gly 210 | Pro | aat Asn | ctt Leu | aca Thr | gaa Glu 215 | Ile | agt Ser | a a a | aaa Lys | att Ile 220 | HILL | gaa Glu | tct Ser | aac Asn | 672 |
| gca Ala 225 | Val | gtt Val | cto Leu | g gct 1 Ala | gtg Val 230 | Lys | gaa Glu | att Ile | gaa Glu | act Thr 285 | тег: | g ctt 1 Leu | gca Ala | tct Ser | ata Ile 240 | 720 |
| gat Asp | gaa Glu | ctt Leu | get Ala | act Thr 245 | : Lys | gct Ala | att Ile | ggt Gly | aaa Lys 250 | ь гла | ata Ile | a caa e Glr | caa Glr | a aat n Asr 255 | ggt Gly | 768 |
| ggt Gly | tta Leu | a gct ı Ala | gto a Val 260 | l Gli | a gcg ı Ala | Gl ⁷ | g cat | aat Asr 265 |) GT | a aca y Thi | a the | g tta ı Lei | a gca a Ala 270 | GI) | gct Ala | 816 |

tat aca ata tca aaa cta ata aca caa aaa tta gat gga ttg aaa aat 864 Tyr Thr Ile Ser Lys Leu Ile Thr Gln Lys Leu Asp Gly Leu Lys Asn 275 tca gaa aaa tta aag gaa aaa att gaa aat gct aag aaa tgt tct gaa 912 \$er Glu Lys Leu Lys Glu Lys Ile Glu Asn Ala Lys Lys Cys Ser Glu 295 290 ϕ at ttt act aaaackslashaaa cta gaa gga gaa cat gcg caa ctt gga att gaa 960 Åsp Phe Thr Lys ಝ s Leu Glu Gly Glu His Ala Gln Leu Gly Ile Glu 1805 310 at gtt act gat gag aat gca aaa aaa gct att tta ata aca gat gca 1008 Asn Val Thr Asp Glu\Asn Ala Lys Lys Ala Ile Leu Ile Thr Asp Ala 325 dct aaa gat aag ggc gkt gca gag ctt gaa aag cta ttt aaa gca gta 1056 Ala Lys Asp Lys Gly Ala Glu Leu Glu Lys Leu Phe Lys Ala Val 345 340 daa aac ttg gca aaa gca 🖟 ct aaa gag atg ctt gct aat tca gtt aaa 1104 dlu Asn Leu Ala Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val Lys 360 355 1112 gag ctt ac Glu Leu 370 <210> 36 <211> 369 <212> PRT <213> Artificial Sequence <220> <223> OspC Chimera <400> 36 Alla Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser Ala 10 Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile 25 Thr Asp Ser Asn Ala Val Leu Leu Ala Val Ays Glu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu Leu Ala Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp Gly Ser Leu Asp Asn Glu Ala Asn Arg VAsn Glu Ser Leu Leu 75 70 Ala Gly Ala Tyr Thr Ile Ser Thr Leu Ile Thr Gln Lys Leu Ser Lys 90 85 Leu Asn Gly Ser Glu Gly Leu Lys Glu Lys Ile Ala Ala Ala Lys Lys 110 100 105 Cy's Ser Glu Glu Phe Ser Thr Lys Leu Lys Asp Asn His Ala Gln Leu 115 120 Gly Ile Gln Gly Val Thr Asp Glu Asn Ala Lys Lys Ala Ile Leu Lys 135 140 Ala Asn Ala Ala Gly Lys Asp Lys Gly Val Glu Glu Leu Glu Lys Leu 150

Suhi

36/102

```
Ser Gly Ser Leu Glu Ser Leu Ser Lys Ala Ala Lys Glu Met Leu Ala
                166
                                     170
Asn Ser Val Lys Gl\psi Leu Thr Ser Pro Val Val His Gly Asn Asn Ser
            180
                                 185
                                                     190
Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys
                             200
                                                 205
Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala
                                             220
                        215
Val Val Leu Ala Val Lyà Glu Ile Glu Thr Leu Leu Ala Ser Ile Asp
                    230
                                         235
Glu Leu Ala Thr Lys Ala \text{\text{Tle Gly Lys Lys Ile Gln Gln Asn Gly Gly}
                245
                                     250
Leu Ala Val Glu Ala Gly His Asn Gly Thr Leu Leu Ala Gly Ala Tyr
                                 265
                                                     270
Thr Ile Ser Lys Leu Ile Thr Gln Lys Leu Asp Gly Leu Lys Asn Ser
                            \280
                                                 285
Glu Lys Leu Lys Glu Lys Ile Çlu Asn Ala Lys Lys Cys Ser Glu Asp
                        295
                                             300
Phe Thr Lys Lys Leu Glu Gly Glu His Ala Gln Leu Gly Ile Glu Asn
                                         315
                    310
Val Thr Asp Glu Asn Ala Lys Ly& Ala Ile Leu Ile Thr Asp Ala Ala
                                     330
                                                          335
Lys Asp Lys Gly Ala Ala Glu Leu Glu Lys Leu Phe Lys Ala Val Glu
                                 345
Asn Leu Ala Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val Lys Glu
                             360
Leu
<210> 37
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<211> 1106
<212> DNA
<213> Artificial Sequence
<220>
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<223> OspC Chimera

<221> CDS <222> (1)...(1106)

<400> 37

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Met Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Ala Ser Ala Asn Ser
1 5 10 15

gct gat gag tct gtt aaa ggg cct aat ctt aca gaa at agt aaa aaa 96
Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys
20 25 30

att aca gaa tot aac gca gtt gtt ctg gcc gtg aaa gaa gtt gag acc 144

Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Val Glu Thr

35 40 45

tta ctt gca tct ata gat gaa ctt gct acc aaa gct att ggt aaa aaa 192 Leu Leu Ala Ser Ile Asp Glu Leu Ala Thr Lys Ala Ile Gly Lys Lys
50 55 60

| 1 | | \ | | | | | | | J., _ | | | | | | | |
|-------------------|--------------------|----------------------|-----------------------|-------------------|-------------------|----------------------|-----------------------|-------------------|-----------------------|---------------------|--------------------|----------------------|---------------------|-------------------|-------------------|-----|
| ata Ile 65 | ggc Gly | aat Asn | aat Asn \ | ggt Gly | tta Leu 70 | gag Glu | gcc Ala | aat Asn | cag Gln | agt Ser 75 | aaa Lys | aac Asn | aca Thr | tca Ser | ttg Leu 80 | 240 |
| tta Leu | tca Ser | gga Gly | gct Ala | tat Tyr 85 | gca Ala | ata Ile | tct Ser | gac Asp | cta Leu 90 | ata Ile | gca Ala | gaa Glu | aaa Lys | tta Leu 95 | aat Asn | 288 |
| gta Val | ttg Leu | aaa Lys | aat Asn 100 | gaa Glu | gaa Glu | tta Leu | aag Lys | gaa Glu 105 | aag Lys | att Ile | gat Asp | aca Thr | gct Ala 110 | aag Lys | caa Gln | 336 |
| tgt Cys | tct Ser | aca Thr 115 | gaa Glu | ttt Phe | act Thr | aat Asn | aaa Lys 120 | cta Leu | aaa Lys | agt Ser | gaa Glu | cat His 125 | gca Ala | gtg Val | ctt Leu | 384 |
| ggt Gly | ctg Leu 130 | gac Asp | aat Asn | ctt Leu | act Thr | gat Asp 135 | gat Asp | aat Asn | gca Ala | caa Gln | aga Arg 140 | gct Ala | att Ile | tta Leu | aaa Lys | 432 |
| aaa Lys 145 | cat His | gca Ala | aat Asn | aaa Lys | gat Asp 150 | aag Lys | ggt Gly | gct Ala | gca Ala | gaa Glu 155 | ctt Leu | gaa Glu | aag Lys | tta Leu | ttt Phe 160 | 480 |
| aaa Lys | gcg Ala | gta Val | gaa Glu | aac Asn 165 | tta Leu | t da Sei | aaa Lys \ | gca Ala | gct Ala 170 | GTH | gac Asp | aca Thr | tta Leu | aaa Lys 175 | aat Asn | 528 |
| gct Ala | gtt Val | aaa Lys | gag Glu 180 | Leu | aca Thr | agt Ser | cct Pro | att Ile 185 | vaı | cat His | ggt Gly | aat Asn | aat Asn 190 | Jer | aga Arg | 576 |
| aaa Lys | gat Asp | ggg Gly 195 | Asn | gca Ala | tct Ser | aca Thr | aat Asn 200 | Ser | gcc Ala | gat Asp | gag Glu | tct Ser 205 | Val | aaa Lys | ggg | 624 |
| cct Pro | aat Asn 210 | Leu | aca Thr | gaa Glu | ata Ile | agt Ser 215 | ьуs | a a a | att Ile | aca Thr | gaa Glu 220 | rer | aac Asn | gca Ala | gtt Val | 672 |
| gtt Val 225 | Let | gcc Ala | gtg Val | aaa Lys | gaa Glu 230 | ı vaı | gag Glu | acc Thr | tta Lei | t ctt Let 235 | LALC | a tct a Ser | ata : Ile | gat Asp | gaa Glu 240 | 720 |
| ctt Leu | gct Ala | aco Thr | aaa Lys | gct Ala 245 | ı Ile | ggt Gly | aaç Lys | g aaa S Lys | a ata s Ile 250 | 3/ GT; | c aat y Asi | aat n Asr | ggt Gly | tta Lev 255 | a gag ı Glu | 768 |
| gcc Ala | aat Asr | caç n Glr | g agt n Sei 260 | r Lys | a aac s Asr | c aca | tca Sei | tte Lev 26 | те | a tca u Se | a gga r Gly | a gct y Ala | tat a Tyr 270 | | a ata a Ile | 816 |
| tct Ser | gao Asj | c cta p Lei 27 | ı Ile | a gca e Ala | a gaa a Glu | a aaa u Lys | a tta s Lei 280 | 1 AS | t gt. n Va | a tt l Le | g aaa u Ly: | a aat s Ast 28 | 01 | a gaa u Gl | a tta u Leu | 864 |
| aaq Lys | g ga s Gl 29 | u Ly | g at | t ga e As | t aca p Thi | a gct r Ala 29 | а гу | g ca s Gl | a tg n Cy | t tc s Se | t ac r Th 30 | f GT | a tt u Ph | t ac e Th | t aat r Asn | 912 |

Sykh!

| aaa c Lys L 305 | ta a eu L | ala a ya S | gt (Ger (| Slu | cat His 310 | gca Ala | gtg Val | ctt Leu | ggt Gly | ctg Leu 315 | gad Asp | c a | at (| ctt Leu | act Thr | gat Asp 320 | 960 |
|------------------------------|--------------|-----------------------|-------------------|-------------------|-------------------|------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------|-------------------|-------------------|-------------------|-------------------|----------|
| gat a Asp A | at g sn A | ca c la G | 31\n 1 | aga Arg 325 | gct Ala | att Ile | tta Leu | aaa Lys | aaa Lys 330 | cat His | gc: Ala | aa aA | at | aaa Lys | gat Asp 335 | aag Lys | 1008 |
| ggt g Gly A | ct c | Ala (| gaa Glu 340 | ctt Leu | gaa Glu | aag Lys | tta Leu | ttt Phe 345 | aaa Lys | gcg Ala | gt. Va | ag 1G | gaa Glu | aac Asn 350 | tta Leu | tca Ser | 1056 |
| aaa g Lys A | la A | gct o Ala (355 | caa Gln | gac\ Asp | aca Thr | tta Leu | aaa Lys 360 | aat Asn | gct Ala | gtt Val | aa Ly | _ | gag Slu 365 | ctt Leu | aca Thr | agt Ser | 1104 |
| cc | | | | | | | | | | | | | | | | | 1106 |
| <210 <211 <212 <213 | > 36 > PR | Г | cial | . Sed | quen | ce \ | \ | | | | | | | | | | |
| <220 <223 | | pC C | hime | era | | | | | | | | | | | | | |
| | Ala | Cys | | | | | | | | | | | | | | Ser | |
| l Ala | Asp | Glu | | Val | Lys | Gly | Pro | Aen | Leu | Th | r G | Lu | Ile | Ser 30 | Lys | Lys | |
| Ile | Thr | | 20 Ser | Asn | Ala | Val | Val | Let | Alā | ı Va | l Ly | ys | Glu 45 | Val | . Glı | ı Thr | |
| Leu | Leu | 35 Ala | Ser | Ile | Asp | Glu | Leu | ı Ala | i Æhi | Ly | s A. | la 1 | Ile | Gly | , Lys | s Lys | |
| Ile | 50 Gly | Asn | Asn | Gly | Leu | 55 Glu | Ala | a Asr | ı Gİ | n Se | r L | | Asn | Thr | Se | Leu 80 | |
| | | | | | 771 | | | | Le | • 13 | | | | | | ı Asn | |
| | | | | | | | | s Glu | انو Ly: | | | | | | a Ly | s Gln | |
| | | | | | | | ı Lys | Lei | | | | | His | Ala | | l Leu | |
| Glv | Leu | 115 Asp | Asn | Leu | ı Thi | . Asp | 120 Asp |) p Asi | n Al | a Gl | .n Þ | rg | 125 Ala | Il | e Le | u Lys | 3 |
| | | | | | | | | | | a Gl | u L | | | | | u Phe | • |
| | | | | | | | | | | | | | | | u Ly | s Asr | |
| | | | | 16 | = | | | | 1 / | ., | | | ` | | | r Arg | |
| | | | | | | | | | | | | | | | | s Gly | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | a Vai | |
| Val 225 | Leu | Ala | Va] | l Ly | s Gl 23 | u Va O | 1 Gl | u Th | r Le | 2. | eu <i>F</i> 35 | лта | se: | , / | - AS | p Gl: 24 | Õ |
| | | | | | | | | | | | | | | | \ | | |

| | | | 39/102 | | | |
|---|---|---|--|---|--|-----|
| Leu Ala The Lys | Ala Ile G 245 | Sly Lys Lys | Ile Gly As 250 | n Asn Gly | Leu Glu 255 | |
| Ala Asn Gln Ser 260 | | hr Ser Leu 265 | Leu Ser Gl | y Ala Tyr 270 | Ala Ile | |
| Ser Asp Leu Ile 275 | Ala Glu L | | Val Leu Ly | | Glu Leu | |
| Lys Glu Lys Ile 290 | | | Cys Ser Th | r Glu Phe | Thr Asn | |
| Lys Leu Lys Ser 305 | Qlu His A | ala Val Leu | Gly Leu As | p Asn Leu | Thr Asp 320 | |
| Asp Asn Ala Gln | | le Leu Lys | | a Asn Lys | Asp Lys 335 | |
| Gly Ala Ala Glu 340 | 1 | ys Leu Phe 345 | Lys Ala Va | l Glu Asn 350 | Leu Ser | |
| Lys Ala Ala Gln 355 | Asp Thr L | | Ala Val Ly | | Thr Ser | |
| <210> 39 <211> 1107 <212> DNA <213> Artificia | l Sequence | <u>,</u> | | | | |
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| (223) OSPC CHIM | CIU | | | | | |
| <221> CDS <222> (1)(11 | 07) | | | | | |
| <400> 39 | | \ | | | | |
| atg gct tgt aat Met Ala Cys Asn 1 | aat tca g Asn Ser G 5 | ga aaa gat Sly Lys Asp | ggg aat gc Gly Asn Al 10 | a tct gca a Ser Ala | aat tot Asn Ser 15 | 48 |
| gct gat gag tct | gtt aaa g | gg cct aat | ctt aca ga | a ata agt | aaa aaa | 96 |
| Ala Asp Glu Ser 20 | | | | | | |
| att aca gaa tct Ile Thr Glu Ser | aac gca g Asn Ala V | tt gtt ctg al Val Leu | gcc gtg aa | a gaa gtt | gag acc | 144 |
| 35 | | | Wfa var ry | | Giu Thr | |
| | | 40 | | 45 | | |
| tta ctt gca tct Leu Leu Ala Ser 50 | Ile Asp G | 40 gaa ctt gct | acc aaa gc Thr Lys Al | 45 t att ggt | aaa aaa | 192 |
| tta ctt gca tct Leu Leu Ala Ser 50 ata ggc aat aat | Ile Asp G | 40 gaa ctt gct Glu Leu Ala 55 gag gcc aat | acc aaa gc Thr Lys Al 6 cag agt aa | 45 t att ggt a Ile Gly 0 a aac aca | aaa aaa Lys Lys tca ttg | 192 |
| tta ctt gca tct Leu Leu Ala Ser 50 | Ile Asp G | 40 gaa ctt gct Glu Leu Ala 55 gag gcc aat | acc aaa gc Thr Lys Al 6 cag agt aa | 45 t att ggt a Ile Gly 0 a aac aca | aaa aaa Lys Lys tca ttg | |
| tta ctt gca tct Leu Leu Ala Ser 50 ata ggc aat aat Ile Gly Asn Asn | ggt tta g Gly Leu G 70 tat gca a | 40 gaa ctt gct Glu Leu Ala 55 gag gcc aat Glu Ala Asn ata tct gac | acc aaa gc Thr Lys Al 6 cag agt aa Gln Ser Ly 75 cta ata gc | 45 t att ggt a Ile Gly 0 a aac aca s Asn Thr | aaa aaa Lys Lys tca ttg Ser Leu 80 tta aat | |
| tta ctt gca tct Leu Leu Ala Ser 50 ata ggc aat aat Ile Gly Asn Asn 65 tta tca gga gct | ggt tta gGly Leu G70 tat gca aTyr Ala I85 | 40 gaa ctt gct Glu Leu Ala 55 gag gcc aat Glu Ala Asn ata tct gac Gle Ser Asp | acc aaa gc Thr Lys Al 6 cag agt aa Gln Ser Ly 75 cta ata gc Leu Ile Al 90 aag att ga | t att ggt a Ile Gly 0 a aac aca s Asn Thr a gaa aaa a Glu Lys | aaa aaa Lys Lys tca ttg Ser Leu 80 tta aat Leu Asn 95 | 240 |

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| \ | | | | | | | | | 10,. | .02 | | | | | | |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| | | | | ttt Phe | | | | | | | | | | | | 384 |
| ggt Gly | ctg Leu 130 | gac Asp | aat Asn | ctt Leu | act Thr | gat Asp 135 | gat Asp | aat Asn | gca Ala | caa Gln | aga Arg 140 | gct Ala | att Ile | tta Leu | aaa Lys | 432 |
| aaa Lys 145 | cat His | gca Ala | aat Asn | aaa Lys | gat Asp 150 | aag Lys | ggt Gly | gct Ala | gca Ala | gaa Glu 155 | ctt Leu | gaa Glu | aag Lys | tta Leu | ttt Phe 160 | 480 |
| aaa Lys | gcg Ala | gta Val | gaa Glu | aac Asn 165 | tta Leu | tca Ser | aaa Lys | gca Ala | gct Ala 170 | caa Gln | gac Asp | aca Thr | tta Leu | aaa Lys 175 | aat Asn | 528 |
| gct Ala | gtt Val | aaa Lys | gag Glu 180 | ctt Leu | aca Thr | agt Ser | cct Pro | att Ile 185 | gtc Val | cat His | ggt Gly | aat Asn | aat Asn 190 | tca Ser | ggg Gly | 576 |
| aaa Lys | gat Asp | ggg Gly 195 | aat Asn | aca Thr | tct Ser | gca Ala | aat Asn 200 | tct Ser | gct Ala | gat Asp | gag Glu | tct Ser 205 | gtt Val | aaa Lys | ggg Gly | 624 |
| | | | | gaa Glu | | | | | | | | | | | | 672 |
| gtt Val 225 | ctc Leu | gcc Ala | gtg Val | aaa Lys | gaa Glu 230 | gtt Val | gaa Glu | act Thr | ttg Leu | ctt Leu 235 | aca Thr | tct Ser | ata Ile | gat Asp | gag Glu 240 | 720 |
| | | | | att Ile 245 | | | | | | | | | | | | 768 |
| aat Asn | gag Glu | gca Ala | gat Asp 260 | cac His | aac Asn | gga Gly | tca Ser | tta Leu 265 | ata Ile | tca Ser | gga Gly | gca Ala | tat Tyr 270 | tta Leu | att Ile | 816 |
| tca Ser | aac Asn | tta Leu 275 | ata Ile | aca Thr | aaa Lys | aaa Lys | ata Ile 280 | agt\ Ser | gca Ala | ata Ile | aaa Lys | gat Asp 285 | tca Ser | gga Gly | gaa Glu | 864 |
| ttg Leu | aag Lys 290 | gca Ala | gaa Glu | att Ile | gaa Glu | aag Lys 295 | gct Ala | aag Lys | aaa Lys | tgt Cys | tct Ser 300 | gaa Glu | gaa Glu | ttt Phe | act Thr | 912 |
| gct Ala 305 | aaa Lys | tta Leu | aaa Lys | ggt Gly | gaa Glu 310 | cac His | aca Thr | gat Asp | ctt Leu | ggt Gly 315 | aaa Lys \ | gaa Glu | ggc Gly | gtt Val | act Thr 320 | 960 |
| gat Asp | gat Asp | aat Asn | gca Ala | aaa Lys 325 | aaa Lys | gcc Ala | att Ile | tta Leu | aaa Lys 330 | aca Thr | aat Asn | aat Asn | gat Asp | aaa Lys 335 | act Thr | 1008 |
| aag Lys | ggc Gly | gct Ala | gat Asp 340 | gaa Glu | ctt Leu | gaa Glu | aag Lys | tta Leu 345 | ttt Phe | gaa Glu | tca Ser | gta Val | aaa Lys 350 | aac Asn | ttg Leu | 1056 |

| , | Sub | AI |
|---|-----|----|
| , | Sub | A۱ |

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tca aaa gca gct aaa gag atg ctt act aat tca gtt aaa gag ctt aca
                                                                  1104
Ser Lys Ala Ala Lys Glu Met Leu Thr Asn Ser Val Lys Glu Leu Thr
                                                                   1107
agc
Ser
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 Thr Glu Ser Asn Ala Val Val Let Ala Val Lys Glu Val Glu Thr Leu
 Leu Ala Ser Ile Asp Glu Leu Ala Thr Lys Ala Ile Gly Lys Lys Ile
 Gly Asn Asn Gly Leu Glu Ala Asn An Ser Lys Asn Thr Ser Leu Leu
                         55
 Ser Gly Ala Tyr Ala Ile Ser Asp Leu Ile Ala Glu Lys Leu Asn Val
                     70
                                     90
 Leu Lys Asn Glu Glu Leu Lys Glu Lys Ile Asp Thr Ala Lys Gln Cys
 Ser Thr Glu Phe Thr Asn Lys Leu Lys Ser Glu His Ala Val Leu Gly
                             120
 Leu Asp Asn Leu Thr Asp Asp Asn Ala Gin Arg Ala Ile Leu Lys Lys
                         135
 His Ala Asn Lys Asp Lys Gly Ala Ala Gl\psi Leu Glu Lys Leu Phe Lys
 Ala Val Glu Asn Leu Ser Lys Ala Ala Gln Asp Thr Leu Lys Asn Ala
                     150
                                      170
 Val Lys Glu Leu Thr Ser Pro Ile Val His Gly Asn Asn Ser Gly Lys
                                  185
  Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro
                              200
  Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val
                          215
  Leu Ala Val Lys Glu Val Glu Thr Leu Leu Thr Ser Ile Asp Glu Leu
                                          235
  Ala Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp Val Ser Leu Asp Asn
                      230
                                       250
  Glu Ala Asp His Asn Gly Ser Leu Ile Ser Gly Ala Tyr Leu Ile Ser
                                   265
  Asn Leu Ile Thr Lys Lys Ile Ser Ala Ile Lys Asp Ser Gly Glu Leu
                               280
  Lys Ala Glu Ile Glu Lys Ala Lys Lys Cys Ser Glu Glu Phe Thr Ala
   Lys Leu Lys Gly Glu His Thr Asp Leu Gly Lys Glu Gly Val Thr Asp
                           295
```

Asp Asn\Ala Lys Lys Ala Ile Leu Lys Thr Asn Asn Asp Lys Thr Lys 325 Gly Ala Asp Glu Leu Glu Lys Leu Phe Glu Ser Val Lys Asn Leu Ser 345 Lys Ala Ala Lys Glu Met Leu Thr Asn Ser Val Lys Glu Leu Thr Ser 355 <210> 41 <211> 1106 <212> DNA <213> Artificial Sequence <220> <223> OspC Chimera <221> CDS <222> (1)...(1106) <400> 41 atg gct tgt aat aat tca gga aaa gat ggg aat gca tct gca aat tct Met Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Ala Ser Ala Asn Ser gct gat gag tct gtt aaa ggg c \Diamond t aat ctt aca gaa ata agt aaa aaa Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys att aca gaa tot aac goa gtt gtt $\delta_{ ext{tg}}$ goo gtg aaa gaa gtt gag acc Ile Thr Glu Ser Asn Ála Val Val Leu Ála Val Lys Glu Val Glu Thr tta ctt gca tct ata gat gaa ctt gct \acc aaa gct att ggt aaa aaa 192 Leu Leu Ála Ser Ile Ásp Glu Leu Ála Ahr Lys Ála Ile Gly Lys Lys ata ggc aat aat ggt tta gag gcc aat cag agt aaa aac aca tca ttg Ile Gly Asn Asn Gly Leu Glu Ala Asn Gln Ser Lys Asn Thr Ser Leu 240 tta tca gga gct tat gca ata tct gac cta at $m{t}_{m{a}}$ gca gaa aaa tta aat 288 Leu Ser Gly Ála Tyr Ála Ile Ser Ásp Leu Ila Ála Glu Lys Leu Asn gta ttg aaa aat gaa gaa tta aag gaa aag att 🎝at aca gct aag caa 336 Val Leu Lys Asn Glu Glu Leu Lys Glu Lys Ile Ásp Thr Ála Lys Gln 100 fgt tot aca gaa ttt act aat aaa cta aaa agt gaa cat gca gtg ctt 384 ¢ýs Ser Thr Glu Phe Thr Asn Lys Leu Lys Ser Glu Ңis Ála Val Leu 120 m dgt ctg gac aat ctt act gat gat aat gca caa aga gcm t att tta aaa 432 díy Leu Ásp Asn Leu Thr Ásp Ásp Asn Ála Gln Arg Ála\Ile Leu Lys 135

| l | | \ | | | | | | | | | | | | | | | |
|---|-------------------|------------|-------------------|-------------------|-------------------|-------------------|------------|-------------------|-------------------|-------------------|-------------------|------------|-------------------|--------------------|-------------------|-------------------|------|
| | | | | | | gat Asp 150 | | | | | | | | | | | 480 |
| | aaa Lys | gcg Ala | gta Val | gaa G¥u | aac Asn 165 | tta Leu | tca Ser | aaa Lys | gca Ala | gct Ala 170 | caa Gln | gac Asp | aca Thr | tta Leu | aaa Lys 175 | aat Asn | 528 |
| | | | | | | aca Thr | | | | | | | | | | | 576 |
| | aaa Lys | gat Asp | ggg Gly 195 | aat Asn | aca Thr | tct Ser | gca Ala | aat Asn 200 | tct Ser | gct Ala | gat Asp | gag Glu | tct Ser 205 | gtt Val | aaa Lys | ggg Gly | 624 |
| | | | | | | ata Ile | | | | | | | | | | | 672 |
| | gtt Val 225 | ctg Leu | gct Ala | gtg Val | aaa Lys | gaa Glu 230 | att | gaa Glu | act Thr | ttg Leu | ctt Leu 235 | gca Ala | tct Ser | ata Ile | gat Asp | gaa Glu 240 | 720 |
| | | | | | | att Ile | | | | | | | | | | | 768 |
| | | | | | | cat His | | | | | | | | | | | 816 |
| | | | | | | aca Thr | | | | | | | | | | | 864 |
| | | | | | | att Ile | | | | | | | | | | | 912 |
| | act Thr 305 | aaa Lys | aaa Lys | cta Leu | gaa Glu | gga Gly 310 | gaa Glu | cat His | gcg Ala | caa Gln | ctt Leu 315 | gga Gly | att Ile | gaa Glu | aat Asn | gtt Val 320 | 960 |
| | | | | | | aaa Lys | | | | | | | | | | | 1008 |
| | gat Asp | aag Lys | ggc Gly | gct Ala 340 | gca Ala | gag Glu | ctt Leu | gaa Glu | aag Lys 345 | cta Leu | ttt Phe | aaa Lys | gda Ala | gta Val \350 | gaa Glu | aac Asn | 1056 |
| | | | | | | aaa Lys | | | | | | | | | | | 1104 |
| | ac | | | | | | | | | | | | | | | | 1106 |
| | c210 |)> 41 | > | | | | | | | | | | | | \ | | |

<210> 42

<212> DNA

\$211> 367 <**2**12> PRT

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Asp Glu Ser\Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile
Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Val Glu Thr Leu
                             40
Leu Ala Ser Ile Asp Glu Leu Ala Thr Lys Ala Ile Gly Lys Lys Ile
                         55
Gly Asn Asn Gly Deu Glu Ala Asn Gln Ser Lys Asn Thr Ser Leu Leu
                                         75
Ser Gay Ala Tyr Ala Ile Ser Asp Leu Ile Ala Glu Lys Leu Asn Val
                                     90
                85
Leu Lys Asn Glu Glu Lys Glu Lys Ile Asp Thr Ala Lys Gln Cys
                                 105
           100
Ser Thr Gla Phe Thr Ash Lys Leu Lys Ser Glu His Ala Val Leu Gly
                                                  125
                             120
        115
Leu Asp Asn Leu Thr Asp Asp Asn Ala Gln Arg Ala Ile Leu Lys Lys
                                              140
His Ala Asn Lys Asp Lys Gl\chi Ala Ala Glu Leu Glu Lys Leu Phe Lys
                                          155
                    150
Ala Val Glu Asn Leu Ser Lys Ala Gln Asp Thr Leu Lys Asn Ala
                                     170
                 165
Val Lys Glu Leu Thr Ser Pro Ile Val His Gly Asn Asn Ser Gly Lys
                                 185
Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro
                             200
Asn Leu Thr Glu Ile Ser Lys Lys Iloldsymbol{arphi} Thr Glu Ser Asn Ala Val Val
                                              220
                         215
Leu Ala Val Lys Glu Ile Glu Thr Leu Leu Ala Ser Ile Asp Glu Leu
                                          235
                     230
Ala Thr Lys Ala Ile Gly Lys Lys Ile Gl\eta Gln Asn Gly Gly Leu Ala
                                      250
                 245
Val Glu Ala Gly His Asn Gly Thr Leu Leu Ala Gly Ala Tyr Thr Ile
                                  265
             260
Ser Lys Leu Ile Thr Gln Lys Leu Asp Gly Leu Lys Asn Ser Glu Lys
                              280
 Leu Lys Glu Lys Ile Glu Asn Ala Lys Lys Cys Ser Glu Asp Phe Thr
                          295
 Lys Lys Leu Glu Gly Glu His Ala Gln Leu Gly I\(\frac{1}{2}\)e Glu Asn Val Thr
                                          315
                      310
 Asp Glu Asn Ala Lys Lys Ala Ile Leu Ile Thr Asp\Ala Ala Lys Asp
                                      330
                 325
 Lys Gly Ala Ala Glu Leu Glu Lys Leu Phe Lys Ala \hat{V}_{f q}l Glu Asn Leu
                                  345
 Ala Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val Lys Glu Leu
                              360
 <210> 43
 <211> 633
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| | | 45/102 | |
|--------------------------------|---|--|---|
| <213> Box | rrelia burgdorferi | | |
| <220> <221> CDS <222> (1 | 5) (633) | | |
| <400> 43 atg aaa Met Lys | aag aat aca tta agt gcg Lys Asn Thr Leu Ser Ala 5 | ata tta atg act Ile Leu Met Thr 10 | tta ttt tta ttt 48 Leu Phe Leu Phe 15 |
| ata tct Ile Ser | tgt aat aat tca ggg aaa Cys Asn Asn Ser Gly Lys 20 | 25 | 30 |
| Ala Asp | gag tct gtt aaa ggg cct Glu Ser Val Lys Gly Pro 35 |) | 45 |
| Ile Thr 50 | gat tot aat gog gtt tta Asp Ser Asn Ala Val Lev 55 | 60 | |
| Leu Leu 65 | tca tct ata gat gaa at Ser Ser Ile Asp Glu Ile 70 | 75 | 80 |
| ata cac Ile His | caa aat aat ggt ttg ga Gln Asn Asn Gly Leu As 85 | t acc gaa aat aat p Thi Glu Asn Asn 90 | cac aat gga tca 288 His Asn Gly Ser 95 |
| ttg tta Leu Leu | gcg gga gct tat gca at Ala Gly Ala Tyr Ala Il 100 | a tca acc cta ata e Ser Thr Leu Ile 105 | aaa caa aaa tta 336 Lys Gln Lys Leu 110 |
| gat gga Asp Gly | ttg aaa aat gaa gga tt Leu Lys Asn Glu Gly Le 115 | u 170 0-1 -1 | gat gcg gct aag 384 Asp Ala Ala Lys 125 |
| Lys Cys | | 14 | 8 |
| Leu Gl | t aaa gaa ggt gtt act g y Lys Glu Gly Val Thr A 150 | 155 | 160 |
| aaa gc Lys Al | a aat ggt act aaa act a a Asn Gly Thr Lys Thr L 165 | 170 | 175 |
| the Gl | a tca gta gag gtc ttg t u Ser Val Glu Val Leu S 180 | 185 | 190 |
| aat to Asn Se | ca gtt aaa gag ctt aca a er Val Lys Glu Leu Thr S 195 | agc cct gtt gtg go Ser Pro Val Val A 200 | ca gaa agt coa aaa 624 la Glu Ser Pro Lys 205 |
| | | | \ |

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633
aaa cct taa
Lys\Pro
    ጀ10
<210> 4
<211> 20\9
<212> PRT
<213> Borkelia burgdorferi
<400> 44
Lys Lys Asn Thr Leu Ser Ala Ile Leu Met Thr Leu Phe Leu Phe Ile
Ser Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser Ala
            20
                                 25
Asp Glu Ser Val\Lys Gly Pro Asn Leu Thr Glu Ile Asn Lys Lys Ile
                            40
Thr Asp Ser Asn Ala Val Leu Leu Ala Val Lys Glu Val Glu Ala Leu
                        55
Leu Ser Ser Ile As\lambda Glu Ile Ala Ala Lys Ala Ile Gly Lys Lys Ile
                                         75
His Gln Asn Asn Gly Neu Asp Thr Glu Asn Asn His Asn Gly Ser Leu
                                     90
Leu Ala Gly Ala Tyr Ala Ile Ser Thr Leu Ile Lys Gln Lys Leu Asp
                                105
Gly Leu Lys Asn Glu Gly Leu Lys Glu Lys Ile Asp Ala Ala Lys Lys
                                                 125
        115
                           120
Cys Ser Glu Thr Phe Thr Asn Lys Leu Lys Glu Lys His Thr Asp Leu
                        135
                                             140
Gly Lys Glu Gly Val Thr Asp\Ala Asp Ala Lys Glu Ala Ile Leu Lys
                    150
                                         155
Ala Asn Gly Thr Lys Thr Lys Gly Ala Glu Glu Leu Gly Lys Leu Phe
                                    170
                165
Glu Ser Val Glu Val Leu Ser Lys\Ala Ala Lys Glu Met Leu Ala Asn
                                 ₹85
                                                     190
Ser Val Lys Glu Leu Thr Ser Pro Val Val Ala Glu Ser Pro Lys Lys
                            200
        195
Pro
<210> 45
<211> 580
<212> DNA
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<220>
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<222> (1)...(580)
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atg gct tgt aat aat tca ggg aaa gat ggg aat aca\tct gca aat tct
                                                                    48
Met Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser
gct gat gag tct gtt aaa ggg cct aat ctt aca gaa atà aat aaa aaa
Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile\Asn Lys Lys
```

| \ | | | | | | | 4// | 102 | | | | | | |
|--|----------------|------------------|-------------------|-------------------|-------------------|------------|------------------|-------------------|-------------------|-------------------|------------|------------------|-------------------|-----|
| att acg ga Ile Thr As | t tct p Ser | aat Asn | gcg Ala | gtt Val | tta Leu 40 | ctt Leu | gct Ala | gtg Val | aaa Lys | gag Glu 45 | gtt Val | gaa Glu | gcg Ala | 144 |
| ttg ctg to Leu Leu Se 50 | a tet r Ser | ata Ile | gat Asp | gaa Glu 55 | att Ile | gct Ala | gct Ala | aaa Lys | gct Ala 60 | att Ile | ggt Gly | aaa Lys | aaa Lys | 192 |
| ata cac ca Ile His Gl 65 | a aat n Asn | aat Asn | ggt Gly 70 | ttg Leu | gat Asp | acc Thr | gaa Glu | aat Asn 75 | aat Asn | cac His | aat Asn | gga Gly | tca Ser 80 | 240 |
| ttg tta go Leu Leu Al | g gga a Gly | gct Ala 85 | tat Tyr | gca Ala | ata Ile | tca Ser | acc Thr 90 | cta Leu | ata Ile | aaa Lys | caa Gln | aaa Lys 95 | tta Leu | 288 |
| gat gga tt Asp Gly Le | | | | | | | | | | | | | | 336 |
| aaa tgt to Lys Cys Se 11 | r Glu | aca Thr | ttt Phe | act Thr | aat Asn 120 | aaa Lys | tta Leu | aaa Lys | gaa Glu | aaa Lys 125 | cac His | aca Thr | gat Asp | 384 |
| ctt ggt aa Leu Gly Ly 130 | a gaa s Glu | ggt Gly | gtt Val | act Thr 135 | gat Asp | gct Ala | gat Asp | gca Ala | aaa Lys 140 | gaa Glu | gcc Ala | att Ile | tta Leu | 432 |
| aaa gca aa Lys Ala As 145 | t ggt n Gly | act Thr | aaa Lys 150 | act Thr | aaa Lys | ggt Gly | gct Ala | gaa Glu 155 | gaa Glu | ctt Leu | gga Gly | aaa Lys | tta Leu 160 | 480 |
| ttt gaa to Phe Glu Se | | | | | | | | | | | | | | 528 |
| aat tca gt Asn Ser Va | | | | | | | | | | | | | | 576 |
| atg g Met | | | | | | | | \ | \ | | | | | 580 |
| <210> 46 <211> 192 <212> PRT <213> Borr | elia 1 | burgo | dorfe | eri | | | | | | \ | | | | |
| <400> 46 Ala Cys As | n Asn | Ser | Gly | Lys | Asp | Gly | Asn | Thr | Ser | Ala | Asn | Ser | Ala | |
| 1 Asp Glu Se | | 5 | | | | Leu | 10 | | | - 1 | | 15 | | |
| Thr Asp Se | | Ala | Val | Leu | | 25 Ala | Val | Lys | Glu | | \30 &1u | Ala | Leu | |
| 35 Leu Ser Se 50 | | Asp | Glu | Ile 55 | 40 Ala | Ala | Lys | Ala | Ile 60 | 45 Gly | LXs | Lys | Ile | |

| | | \ | | | | | | | | 48/1 | .02 | | | | | | |
|---|----------------------|------------------------------|-------------------|------------------|------------------|------------------|------------------|-----------------------|----------------------|------------------|--------------|--------------|------------------|------------------|---------------------|---------------------|-----|
| | C F | Gln\F | | | | 70 | | | | | 10 | | | | | 00 | |
|] | 65 Leu <i>l</i> | Ala d | ħλ į | Ala | Tyr | Ala | Ile | Ser | Thr | Leu | Ile | Lys | Gln | Lys | Leu 95 | Asp | |
| | | Leu I | rak : | Asn | 25 | | | | | 90 | | | | | ,, | | |
| | _ | Ser (| Glu\ | \ | | | | 120 | Leu | | | | 123 | | | | |
| | | Lys (| Glu | G / y | Val | Thr | Asp 135 | Ala | Asp | Ala | Lys | Glu 140 | Ala | Ile | Leu | Lys | |
| | Ala . | 130 Asn (| Gly | Thr | Lys | Thr | Lys | Gly | Ala | Glu | Glu 155 | | Gly | Lys | Leu | Phe 160 | |
| | 145 Glu | Ser ' | Val | Glu | | 150 Leu | Ser | Lys | Ala | Ala | | Glu | Met | Leu | Ala 175 | | |
| | Ser | Val : | Lys | Glu 180 | 165 Leu | Thr | Ser | Pro | Val 185 | 170 Val | Ala | Glu | Ser | Pro 190 | | Met | |
| | <211 <212 <213 | > 47 > 63 > DN > Bo | 9 A | .ia 🤉 | gariı | hii | \ | | | | | | | | | | |
| | | > CD > (1 | | (63 | 9) | | | | | | | | | | | | |
| | 2+4 |)> 47 aaa Lys | 220 | aat Asn | aca Thr 5 | tta Leu | agt Ser | gcg Ala | ata Ile | tta Leu 10 | Met | act Thr | tta Leu | ttt Phe | tta Leu 15 | ttt | 48 |
| | ata Ile | tct Ser | tgt Cys | agt Ser 20 | aat Asn | tca Ser | ggg Gly | aaa Lys | \ggt G1y 25 | GIA | gat Asp | tct Ser | gca Ala | tct Ser 30 | 1111 | aat Asn | 96 |
| | cct Pro | gct Ala | gac Asp 35 | gag Glu | tct Ser | gcg Ala | aaa Lys | ggg Gly 40 | Pro | aat Asn | ctt Leu | aca Thr | gaa Glu 45 | | ago Ser | aaa Lys | 144 |
| | aaa Lys | att Ile 50 | aca Thr | gat Asp | tct Ser | aat Asn | gca Ala 55 | Phe | gta Val | ctt Leu | gct Ala | gtt a Val | гра | a gaa s Glu | a gtt 1 Val | gag Glu | 192 |
| | act Thr 65 | ttg Leu | gtt Val | tta Leu | tct Ser | ata Ile 70 | Asp | gaa Glu | ctt Lei | gct Ala | a Lys | s na: | a gct s Ala | att a Ile | ggt Gly | caa Gln 80 | 240 |
| | aaa Lys | ata Ile | gac Asp | aat Asr | aat Asr 85 | ı Asr | ggt Gly | tta Lei | a gct a Ala | gct Ala 90 | те п | a aa | t aat n Asi | t cad | g aat n Asi 9 | t gga n Gly 5 | 288 |
| | tcg Ser | ttg Leu | tta Leu | gca Ala | a Gly | a gco / Ala | tat Tyr | gca Ala | a ata a Ile 10 | e se: | a acer Th | c dt r Le | a ato u Ilo | a aca e Thi | . 01 | a aaa u Lys | 336 |
| | ttg Leu | agt Ser | aaa Lys 115 | Lei | g aaa 1 Lys | a aat s Ası | tta Leu | a gaa ı Glı 120 | a GI | a tt u Le | a aa u Ly | g ac s Th | ga r Gl 12 | u II | t gc e Al | a aag a Lys | 384 |

| • | | | 1 | | | | | | 49/ | 102 | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|---|--|--|-----|
| | | | tgt Cys | | | | | | | | | | | | | 432 |
| | | | ggc Gly | | | | | | | | | | | | | 480 |
| att Ile | tta Leu | aaa Lys | aca Thr | cat His 165 | gca Ala | act Thr | acc Thr | gat Asp | aaa Lys 170 | ggt Gly | gct Ala | aaa Lys | gaa Glu | ttt Phe 175 | aaa Lys | 528 |
| | | | gaa Glu 180 | | | | | | | | | | | | | 576 |
| cta Leu | act Thr | aat Asn 195 | tca Ser | gtt Val | aaa Lys | gaa Glu | ctt Leu 200 | aca Thr | agt Ser | cct Pro | gtt Val | gta Val 205 | gca Ala | gaa Glu | agt Ser | 624 |
| | | aaa Lys | cct Pro | taa * | | | | | | | | | | | | 639 |
| <213 | 0> 48 1> 21 | 11 | | | | | | | | | | | | | | |
| | 3> Bo | orrel | lia q | garin | nii | | | | | | | | | | | |
| <213 <400 | 3> Bo 0> 48 | orrel B | lia q Thr | Leu | | Ala | Ile | Leu | Met | Thr | Leu | Phe | Leu | | Ile | |
| <213 <400 Lys 1 | 3> Bo D> 48 Lys | orrel B Asn | Thr | Leu 5 | Ser | | | Gly | 1\0 | | | | Thr | 15 | | |
| <213 <400 Lys 1 Ser | 3> Bo D> 48 Lys Cys | orrel 3 Asn Ser Glu | Thr | Leu 5 Ser | Ser Gly | Lys | Gly Pro | Gly 25 | 1\0 Asp | Ser | Ala | Ser Ile | Thr 30 | 15 Asn | Pro | |
| <213 <400 Lys 1 Ser Ala | 3> Bo D> 48 Lys Cys Asp | Asn Ser Glu 35 | Thr Asn 20 | Leu 5 Ser Ala | Ser Gly Lys | Lys Gly Phe | Gly Pro 40 | Gly 25 Asn | 10 Asp Leu | Ser Thr | Ala Glu | Ser Ile 45 | Thr 30 Ser | 15 Asn Lys | Pro Lys | |
| <213 <400 Lys 1 Ser Ala Ile | 3> Bo D> 48 Lys Cys Asp Thr 50 | Asn Ser Glu 35 Asp | Thr Asn 20 Ser | Leu 5 Ser Ala Asn | Ser Gly Lys Ala | Lys Gly Phe 55 | Gly Pro 40 Val | Gly 25 Asn Leu | 10 Asp Leu Ala | Ser Thr Val | Ala Glu Lys 60 | Ser Ile 45 Glu | Thr 30 Ser Val | 15 Asn Lys Glu | Pro Lys Thr | |
| <213 <400 Lys 1 Ser Ala Ile Leu 65 | 3> Bo Lys Cys Asp Thr 50 Val | Asn Ser Glu 35 Asp | Thr Asn 20 Ser | Leu 5 Ser Ala Asn Ile | Ser Gly Lys Ala Asp 70 | Lys Gly Phe 55 Glu | Gly Pro 40 Val Leu | Gly 25 Asn Leu Ala | 10 Asp Leu Ala Lys | Ser Thr Val Lys 75 | Ala Glu Lys 60 Ala | Ser Ile 45 Glu Ile | Thr 30 Ser Val Gly | 15 Asn Lys Glu Gln | Pro Lys Thr Lys 80 | |
| <213 <400 Lys 1 Ser Ala Ile Leu 65 Ile | 3> Bo Lys Cys Asp Thr 50 Val | Ser Glu 35 Asp Leu Asn | Thr Asn 20 Ser Ser | Leu 5 Ser Ala Asn Ile Asn 85 | Ser Gly Lys Ala Asp 70 Gly | Lys Gly Phe 55 Glu Leu | Gly Pro 40 Val Leu Ala | Gly 25 Asn Leu Ala | Ala Lys Leu 90 | Thr Val Lys 75 Asn | Ala Glu Lys 60 Ala Asn | Ser Ile 45 Glu Ile Gln | Thr 30 Ser Val Gly Asn | 15 Asn Lys Glu Gln Gly 95 | Pro Lys Thr Lys 80 Ser | |
| <213 <400 Lys 1 Ser Ala Ile Leu 65 Ile Leu | 3> Bo Lys Cys Asp Thr 50 Val Asp Leu | Ser Glu 35 Asp Leu Asn Ala | Thr Asn 20 Ser Ser Ser Gly | Leu 5 Ser Ala Asn Ile Asn 85 Ala | Ser Gly Lys Ala Asp 70 Gly Tyr | Lys Gly Phe 55 Glu Leu Ala | Gly Pro 40 Val Leu Ala | Gly 25 Asn Leu Ala Ala Ser 105 | Asp Leu Ala Lys Leu 90 Thr | Ser Thr Val Lys 75 Asn | Ala Glu Lys 60 Ala Asn | Ser Ile 45 Glu Ile Gln Thr | Thr 30 Ser Val Gly Asn Glu 110 | 15 Asn Lys Glu Gln Gly 95 Lys | Pro Lys Thr Lys 80 Ser Leu | |
| <213 <400 Lys 1 Ser Ala Ile Leu 65 Ile Leu Ser Lys | 3> Bo Lys Cys Asp Thr 50 Val Asp Leu Lys | Asn Ser Glu 35 Asp Leu Asn Ala Leu 115 Cys | Thr Asn 20 Ser Ser Ser Asn Gly 100 Lys Ser | Leu 5 Ser Ala Asn Ile Asn 85 Ala Asn Glu | Ser Gly Lys Ala Asp 70 Gly Tyr Leu Glu | Lys Gly Phe 55 Glu Leu Ala Glu Phe 135 | Gly Pro 40 Val Leu Ala Ile Glu 120 Thr | Gly 25 Asn Leu Ala Ala Ser 105 Leu Asn | Leu Ala Lys Leu 90 Thr Lys Lys | Thr Val Lys 75 Asn Leu Thr | Ala Glu Lys 60 Ala Asn Tle Glu Lys 140 | Ser Ile 45 Glu Ile Gln Thr Ile 125 Ser | Thr 30 Ser Val Gly Asn Glu 110 Ala | 15 Asn Lys Glu Gln Gly 95 Lys Lys | Pro Lys Thr Lys 80 Ser Leu Ala Ala | |
| <213 <400 Lys 1 Ser Ala Ile Leu 65 Ile Leu Ser Lys | 3> Bo Lys Cys Asp Thr 50 Val Asp Leu Lys | Asn Ser Glu 35 Asp Leu Asn Ala Leu 115 Cys | Thr Asn 20 Ser Ser Asn Gly 100 Lys | Leu 5 Ser Ala Asn Ile Asn 85 Ala Asn Glu | Ser Gly Lys Ala Asp 70 Gly Tyr Leu Glu | Lys Gly Phe 55 Glu Leu Ala Glu Phe 135 | Gly Pro 40 Val Leu Ala Ile Glu 120 Thr | Gly 25 Asn Leu Ala Ala Ser 105 Leu Asn | Leu Ala Lys Leu 90 Thr Lys Lys | Thr Val Lys 75 Asn Leu Thr | Ala Glu Lys 60 Ala Asn Tle Glu Lys 140 | Ser Ile 45 Glu Ile Gln Thr Ile 125 Ser | Thr 30 Ser Val Gly Asn Glu 110 Ala | 15 Asn Lys Glu Gln Gly 95 Lys Lys | Pro Lys Thr Lys 80 Ser Leu Ala Ala | |
| <213 <400 Lys 1 Ser Ala Ile Leu 65 Ile Leu Ser Lys Asp 145 | 3> Bo Lys Cys Asp Thr 50 Val Asp Leu Lys Lys 130 Leu | Asn Ser Glu 35 Asp Leu Asn Ala Leu 115 Cys | Thr Asn 20 Ser Ser Ser Asn Gly 100 Lys Ser | Leu 5 Ser Ala Asn Ile Asn 85 Ala Asn Glu Gln | Ser Gly Lys Ala Asp 70 Gly Tyr Leu Glu Asp 150 | Lys Gly Phe 55 Glu Leu Ala Glu Phe 135 Ala | Gly Pro 40 Val Leu Ala Ile Glu 120 Thr | Gly 25 Asn Leu Ala Ala Ser 105 Leu Asn | Leu Ala Lys Leu 90 Thr Lys Lys Asp | Ser Thr Val Lys 75 Asn Leu Thr Leu His 155 | Ala Glu Lys 60 Ala Asn Tle Glu Lys 140 Ala | Ser Ile 45 Glu Ile Gln Thr Ile 125 Ser | Thr 30 Ser Val Gly Asn Glu 110 Ala Gly Ala | 15 Asn Lys Glu Gln Gly 95 Lys Lys His | Pro Lys Thr Lys 80 Ser Leu Ala Ala Ile 160 | |
| <213 <400 Lys 1 Ser Ala Ile Leu 65 Ile Leu Ser Lys Asp 145 Leu | 3> Bo Lys Cys Asp Thr 50 Val Asp Leu Lys 130 Leu | Asn Ser Glu 35 Asp Leu Asn Ala Leu 115 Cys Gly Thr | Thr Asn 20 Ser Ser Ser Asn Gly 100 Lys Ser Lys | Leu 5 Ser Ala Asn Ile Asn Glu Gln Ala 165 | Ser Gly Lys Ala Asp 70 Gly Tyr Leu Glu Asp 150 Thr | Lys Gly Phe 55 Glu Leu Ala Glu Phe 135 Ala Thr | Gly Pro 40 Val Leu Ala Ile Glu 120 Thr Thr | Gly 25 Asn Leu Ala Ala Ser 105 Leu Asn Asp | Leu Ala Lys Leu 90 Thr Lys Asp Gly 170 | Thr Val Lys 75 Asn Leu Thr Leu His 155 Ala | Ala Glu Lys 60 Ala Asn Tle Glu Lys 140 Ala | Ser Ile 45 Glu Ile Gln Thr Ile 125 Ser Lys | Thr 30 Ser Val Gly Asn Glu 110 Ala Gly Ala Phe | 15 Asn Lys Glu Gln Gly 95 Lys Lys His Ala Lys | Pro Lys Thr Lys 80 Ser Leu Ala Ala Ile 160 Asp | |

| | | | | | | | | | 50/ | 102 | | | | | | |
|-------------------|-----------------------------------|------------|------------|-------------------|-------------------|-------------------|----------------|------------|-------------------|-------------------|-------------------|------------|------------|-------------------|-------------------|-----|
| ГАЕ | Lys 210 | Pro | | | | | | | | | | | | | | |
| <211 <212 | 0> 4 ! 1> 62 2> Di 3> Bo | 24 VA | lia a | afze] | lii | | | | | | | | | | | |
| | l> CI | • | .\(62 | 4) | | | | | | | | | | | | |
| atg Met | | aag | | | | | | | Leu | | | | | tta Leu | | 48 |
| l ata | tct Ser | tgt Cvs | aat Asn | aat Asn | tca Ser | ggt Glv | ggg Gl v | gat Asp | tct Ser | gca Ala | tct Ser | act Thr | aat Asn | cct Pro | gat Asp | 96 |
| 110 | 501 | Cyb | 20 | 71511 | \ | O ₁ | O ₁ | 25 | 001 | | 001 | | 30 | | 1.0p | |
| | | | | | | | | | | | | | | att Ile | | 144 |
| gat Asp | tct Ser 50 | aat Asn | gca Ala | ttt Phe | tta Leu | ctg Let 55 | gct Ala | gtg Val | aaa Lys | gaa Glu | gtt Val 60 | gag Glu | gct Ala | ttg Leu | ctt Leu | 192 |
| | | | | | | | | | | | | | | aaa Lys | | 240 |
| | | | | | | | | | | | | | | ata Ile 95 | | 288 |
| | | | | | | | Leu | | Thr | | | | | gta Val | | 336 |
| | | | | | | | | | | | | | | tgt Cys | | 384 |
| caa Gln | aaa Lys 130 | ttt Phe | act Thr | act Thr | aag Lys | cta Leu 135 | aaa Lys | gat Asp | agt Ser | cat His | gca Ala 140 | gag Glu | ctt Leu | ggt Gly | ata Ile | 432 |
| caa Gln 145 | agc Ser | gtt Val | cag Gln | gat Asp | gat Asp 150 | aat Asn | gca Ala | aaa Lys | aaa Lys | gct Ala 155 | att Ile | tta Leu | aaa Lys | aca Thr | cat His 160 | 480 |
| gga Gly | act Thr | aaa Lys | gac Asp | aag Lys 165 | ggt Gly | gct Ala | aaa Lys | gaa Glu | ctt Leu 170 | gaa Glu | gag Glu | tta Leu | Rhe | aaa Lys 175 | tca Ser | 528 |
| | | | | | | | | | | | | | | \ | | |

cta gaa agc t\tg tca aaa gca gcg caa gca gca tta act aat tca gtt 576 Leu Glu Ser Leu Ser Lys Ala Ala Gln Ala Ala Leu Thr Asn Ser Val 180 185 624 aaa qaq ctt aca \aat cct gtt gtg gca gaa agt cca aaa aaa cct taa Lys Glu Leu Thr Asn Pro Val Val Ala Glu Ser Pro Lys Lys Pro * 200 205 195 <210> 50 <211> 206 <212> PRT <213> Borrelia afzelii <400> 50 Lys Lys Asn Thr Leu Ser Ala Ile Leu Met Thr Leu Phe Leu Phe Ile 10 Ser Cys Asn Asn Ser Gly Gl Asp Ser Ala Ser Thr Asn Pro Asp Glu 25 Ser Ala Lys Gly Pro Asn Leu Thr Val Ile Ser Lys Lys Ile Thr Asp 45 Ser Asn Ala Phe Leu Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser 55 Ser Ile Asp Glu Leu Ser Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp 70 75 Gly Thr Leu Asp Asn Glu Ala Asn\Arg Asn Glu Ser Leu Ile Ala Gly 90 Ala Tyr Glu Ile Ser Lys Leu Ile thr Gln Lys Leu Ser Val Leu Asn 105 Ser Glu Glu Leu Lys Lys Lys Ile Lys Glu Ala Lys Asp Cys Ser Gln 120 125 Lys Phe Thr Thr Lys Leu Lys Asp Ser\ His Ala Glu Leu Gly Ile Gln 135 140 Ser Val Gln Asp Asp Asn Ala Lys Lys Ala Ile Leu Lys Thr His Gly 150 155 Thr Lys Asp Lys Gly Ala Lys Glu Leu Glu Glu Leu Phe Lys Ser Leu 17/0 165 175 Glu Ser Leu Ser Lys Ala Ala Gln Ala Ala Leu Thr Asn Ser Val Lys 185 Glu Leu Thr Asn Pro Val Val Ala Glu Ser Pro Lys Lys Pro 200 <210> 51 <211> 1680 <212> DNA <213> ospC Chimera <220> <221> CDS <222> (1)...(1680) <400> 51 atg gct tgt aat aat tca ggg aaa gat ggg aat aca tct gca aat tct Met Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser 5 10 15

| | | ` | \ | | | | | | | | | | | | | |
|-------------------|-------------------|------------------------|-------------------|-----------------------|---------------------|-------------------|-------------------|-------------------|-------------------|---------------------|-----------------------|-------------------|-------------------|----------------------|-----------------------|-----|
| gct Ala | gat Asp | gag Glu | tet Ser 20 | gtt Val | a a a Lys | ggg Gly | cct Pro | aat Asn 25 | ctt Leu | aca Thr | gaa Glu | ata Ile | agt Ser 30 | aaa Lys | aaa Lys | 96 |
| att Ile | acg Thr | gat Asp 35 | tct Ser | aat Asn | gcg Ala | gtt Val | tta Leu 40 | ctt Leu | gct Ala | gtg Val | aaa Lys | gag Glu 45 | gtt Val | gaa Glu | gcg Ala | 144 |
| ttg Leu | ctg Leu 50 | tca Ser | tct Ser | ata Ile | gat Asp | gaa Glu 55 | att Ile | gct Ala | gct Ala | aaa Lys | gct Ala 60 | att Ile | ggt Gly | aaa Lys | aaa Lys | 192 |
| ata Ile 65 | cac His | caa Gln | aat Asn | aat Asn | ggt G1 y 70 | ttg Leu | gat Asp | acc Thr | gaa Glu | tat Tyr 75 | aat Asn | cac His | aat Asn | gga Gly | tca Ser 80 | 240 |
| ttg Leu | tta Leu | gcg Ala | gga Gly | gct Ala 85 | tat Tyr | gca Ala | ata Ile | tca Ser | acc Thr 90 | cta Leu | ata Ile | aaa Lys | caa Gln | aaa Lys 95 | tta Leu | 288 |
| gat Asp | gga Gly | ttg Leu | aaa Lys 100 | aat Asn | gaa Glu | gga Gly | tta Leu | aag Lys 105 | gaa Glu | aaa Lys | att Ile | gat Asp | gcg Ala 110 | gct Ala | aag Lys | 336 |
| aaa Lys | tgt Cys | tct Ser 115 | gaa Glu | aca Thr | ttt Phe | act Thr | aat Asn 120 | aaa Lys | tta Leu | aaa Lys | gaa Glu | aaa Lys 125 | cac His | aca Thr | gat Asp | 384 |
| ctt Leu | ggt Gly 130 | Lys | gaa Glu | ggt Gly | gtt Val | act Thr 135 | gat Asp | gct Ala | gat Asp | gca Ala | aaa Lys 140 | GIU | gcc Ala | att Ile | tta Leu | 432 |
| aaa Lys 145 | aca Thr | aat Asn | ggt Gly | act Thr | aaa Lys 150 | Thr | aaa Lys | ggt Gly | gct Ala | gaa Glu 155 | GIU | ctt Leu | gga Gly | aaa Lys | tta Leu 160 | 480 |
| ttt Phe | gaa Glu | tca Ser | gta Val | gag Glu 165 | Val | ttg Leu | tca Ser | aaa Lys | gca Ala 170 | / _{AT9} | aaa Lys | gag Glu | atg Met | ctt Leu 175 | gct Ala | 528 |
| aat Asn | tca Ser | gtt Val | aaa Lys 180 | Glu | ctt Leu | aca Thr | ago Ser | cct Pro 185 | val | g t g Val | gca Ala | gaa Glu | agt Ser 190 | . FIC | gcc Ala | 576 |
| atg Met | ggt Gly | agt Ser 195 | Asn | tca Ser | Gl ⁷ | j aaa / Lys | ggt Gly 200 | , стй | gat Asp | tct Ser | gca Ala | tct Ser 205 | . 1111 | aat Asr | cct Pro | 624 |
| gct Ala | gad Asp 210 | o Glu | g tct 1 Ser | gcg Ala | ı aaa Lys | ggg Gly 215 | rPro | aat Asr | ctt Leu | aca 1 Thi | a gaa r Glu 220 | 1/11 | a ago e Sei | c aaa c Lys | a aaa s Lys | 672 |
| att Ile 225 | Thi | a gat r As <u>r</u> | t tct p Sei | aat Asr | gca n Ala 230 | a Phe | gta Val | a ctt L Lei | gct Ala | gt! a Va: 23! | т гра | a gaa s Gl | a gtt Val | t gad l Gli | g act 1 Thr 240 | 720 |
| tto Lev | g gti 1 Va: | t tta l Le | a tci u Sei | t ata r Ile 249 | e Ası | t gaa o Glu | a cti ı Lei | t gct u Ala | a Ly: 250 | S гъ | a gc | t ati | t ggt e Gl | t car y Gli 25 | a aaa n Lys 5 | 768 |
| | | | | | | | | | | | | | | | | |

| - 1 | | | - 1 | | | | | | | | | | | | | | |
|-----|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| / | ata Ile | gac Asp | aat Asn | aat Asn 260 | aat Asn | ggt Gly | tta Leu | gct Ala | gct Ala 265 | tta Leu | aat Asn | aat Asn | cag Gln | aat Asn 270 | gga Gly | tcg Ser | 816 |
| | ttg Leu | tta Leu | gca Ala 275 | gga dly | gcc Ala | tat Tyr | gca Ala | ata Ile 280 | tca Ser | acc Thr | cta Leu | ata Ile | aca Thr 285 | gaa Glu | aaa Lys | ttg Leu | 864 |
| | | | | | aat Asn | | | | | | | | | | | | 912 |
| | | | | | gaa Glu | | | | | | | | | | | | 960 |
| | gat Asp | ctt Leu | ggc Gly | aaa Lys | cag Gln 325 | gat Asp | gct Ala | acc Thr | gat Asp | gat Asp 330 | cat His | gca Ala | aaa Lys | gca Ala | gct Ala 335 | att Ile | 1008 |
| | | | | | gca Ala | | | | | | | | | | | | 1056 |
| | | | | | gta Val | | | | | | | | | | | | 1104 |
| | | | | | aaa Lys | | | | | | | | | | | | 1152 |
| | tct Ser 385 | gca Ala | tct Ser | act Thr | aat Asn | cct Pro 390 | gat Asp | gag Glu | tct Ser | gca Ala | aaa Lys 395 | gga Gly | cct Pro | aat Asn | ctt Leu | acc Thr 400 | 1200 |
| | | | | | aaa Lys 405 | | | | | | | | | | | | 1248 |
| | | | | | gct Ala | | | | | | | | | | | | 1296 |
| | | | | | ata Ile | | | | | | | | | | | | 1344 |
| | cga Arg | aac Asn 450 | gaa Glu | tca Ser | ttg Leu | ata Ile | gca Ala 455 | gga Gly | gct Ala | tat Tyr | gaa Glu | ata Ile 460 | tca Ser | aaa Lys | cta Leu | ata Ile | 1392 |
| | aca Thr 465 | caa Gln | aaa Lys | tta Leu | agt Ser | gta Val 470 | ttg Leu | aat Asn | tca Ser | gaa Glu | gaa Glu 475 | tta Leu | aag Lys | aaa Lys | aaa Lys | att Ile 480 | 1440 |

aaa gag gct aag gat tgt tcc caa aaa ttt act act aag cta aaa gat 1488 Lys Glu Ala Lys Asp Cys Ser Gln Lys Phe Thr Thr Lys Leu Lys Asp 485 490 1536 agt cat gca gag\ctt ggt ata caa agc gtt cag gat gat aat gca aaa Ser His Ala Glu Leu Gly Ile Gln Ser Val Gln Asp Asp Asn Ala Lys 500 505 aaa gct att tta aaa aca cat gga act aaa gac aag ggt gct aaa gaa 1584 Lys Ala Ile Leu Lys Thr His Gly Thr Lys Asp Lys Gly Ala Lys Glu 520 515 ctt gaa gag tta ttt haa tca cta gaa agc ttg tca aaa gca gcg caa 1632 Leu Glu Glu Leu Phe Ays Ser Leu Glu Ser Leu Ser Lys Ala Ala Gln 535 530 gca gca tta act aat tca gtt aaa gag ctt aca aat cct gtt gtg gca Ala Ala Leu Thr Asn Ser Val Lys Glu Leu Thr Asn Pro Val Val Ala 1680 545 550 555 <210> 52 <211> 560 <212> PRT <213> ospC Chimera <400> 52 Met Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser 10 Ala Asp Glu Ser Val Lys Gly Pro\ Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Asp Ser Asn Ala Val Leu Leu Leu Ala Val Lys Glu Val Glu Ala 40 Leu Leu Ser Ser Ile Asp Glu Ile Ala Lys Ala Ile Gly Lys Lys 55 Ile His Gln Asn Asn Gly Leu Asp Thr Glu Tyr Asn His Asn Gly Ser Leu Leu Ala Gly Ala Tyr Ala Ile Ser Thr Leu Ile Lys Gln Lys Leu Asp Gly Leu Lys Asn Glu Gly Leu Lys Glu Lys Ile Asp Ala Ala Lys 100 Lys Cys Ser Glu Thr Phe Thr Asn Lys Let Lys Glu Lys His Thr Asp 120 125 115 Leu Gly Lys Glu Gly Val Thr Asp Ala Asp \Ala Lys Glu Ala Ile Leu 135 140 Lys Thr Asn Gly Thr Lys Thr Lys Gly Ala Qlu Glu Leu Gly Lys Leu 150 145 Phe Glu Ser Val Glu Val Leu Ser Lys Ala Ala Lys Glu Met Leu Ala 170 165 Asn Ser Val Lys Glu Leu Thr Ser Pro Val Val\Ala Glu Ser Pro Ala 185 180 Met Gly Ser Asn Ser Gly Lys Gly Gly Asp Ser Ala Ser Thr Asn Pro 195 Ala Asp Glu Ser Ala Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys 215 Ile Thr Asp Ser Asn Ala Phe Val Leu Ala Val Ly& Glu Val Glu Thr

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Leu Val L⊫u Ser Ile Asp Glu Leu Ala Lys Lys Ala Ile Gly Gln Lys
                                    250
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Ile Asp Ash Asn Asn Gly Leu Ala Ala Leu Asn Asn Gln Asn Gly Ser
            260
                                265
Leu Leu Ala\Gly Ala Tyr Ala Ile Ser Thr Leu Ile Thr Glu Lys Leu
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                             280
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Ser Lys Leu Lys Asn Leu Glu Glu Leu Lys Thr Glu Ile Ala Lys Ala
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                                             300
Lys Lys Cys Set Glu Glu Phe Thr Asn Lys Leu Lys Ser Gly His Ala
305
                    310
                                         315
Asp Leu Gly Lys \Gln Asp Ala Thr Asp Asp His Ala Lys Ala Ala Ile
                                    330
                B25
Leu Lys Thr His Ala Thr Thr Asp Lys Gly Ala Lys Glu Phe Lys Asp
                                345
Leu Phe Glu Ser Val Glu Gly Leu Leu Lys Ala Ala Gln Val Ala Leu
                            360
                                                 365
Thr Asn Ser Val Lys\Glu Leu Gly His Arg Asn Asn Ser Gly Gly Asp
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                                             380
Ser Ala Ser Thr Asn Aro Asp Glu Ser Ala Lys Gly Pro Asn Leu Thr
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Val Ile Ser Lys Lys I≒e Thr Asp Ser Asn Ala Phe Leu Leu Ala Val
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                                     410
Lys Glu Val Glu Ala Led Leu Ser Ser Ile Asp Glu Leu Ser Lys Ala
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                                 425
Ile Gly Lys Lys Ile Lys Asn Asp Gly Thr Leu Asp Asn Glu Ala Asn
        435
                            440
                                                 445
Arg Asn Glu Ser Leu Ile Ala Gly Ala Tyr Glu Ile Ser Lys Leu Ile
                                             460
Thr Gln Lys Leu Ser Val Leu Asn Ser Glu Glu Leu Lys Lys Lys Ile
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                                         475
Lys Glu Ala Lys Asp Cys Ser\Gln Lys Phe Thr Thr Lys Leu Lys Asp
                                     490
                                                         495
                485
Ser His Ala Glu Leu Gly Ile Gln Ser Val Gln Asp Asp Asn Ala Lys
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                                                     510
Lys Ala Ile Leu Lys Thr His Gly Thr Lys Asp Lys Gly Ala Lys Glu
                             520
                                                 525
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Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys

25

20

48

| 5 | 6 | / | 1 | 0 | 2 |
|---|---|---|---|---|---|
| | | | | | |

| | | \ | | | | | | | | | | | | | | |
|-------------------|-------------------|-------------------|-------------------|--------------------|-------------------|-----------------------|-------------------|-------------------|--------------------|--------------------|--------------------|-----------------------|-------------------|--------------------|-----------------------|-----|
| att Ile | acg Thr | gat Asp 35 | tct Ser | aat Asn | gcg Ala | gtt Val | tta Leu 40 | ctt Leu | gct Ala | gtg Val | aaa Lys | gag Glu 45 | gtt Val | gaa Glu | gcg Ala | 144 |
| ttg Leu | ctg Leu 50 | tca Ser | tot Sei | ata Ile | gat Asp | gag Glu 55 | ctt Leu | gct Ala | aaa Lys | gct Ala | att Ile 60 | ggt Gly | aaa Lys | aaa Lys | ata Ile | 192 |
| aaa Lys 65 | aac Asn | gat Asp | ggt Gly | agt Ser | tta Leu 70 | gat Asp | aat Asn | gaa Glu | gca Ala | aat Asn 75 | cgc Arg | aac Asn | gag Glu | tca Ser | ttg Leu 80 | 240 |
| tta Leu | gca Ala | gga Gly | gct Ala | tat Tyr 85 | aca Thr | ata Ile | tca Ser | acc Thr | tta Leu 90 | ata Ile | aca Thr | caa Gln | aaa Lys | tta Leu 95 | agt Ser | 288 |
| aaa Lys | tta Leu | aac Asn | gga Gly 100 | tca Ser | gaa Glu | ggt Gly | tta Leu | aag Lys 105 | gaa Glu | aag Lys | att Ile | gcc Ala | gca Ala 110 | gct Ala | aag Lys | 336 |
| aaa Lys | tgc Cys | tct Ser 115 | gaa Glu | gag Glu | ttt Phe | agt Ser | act Thr 120 | aaa Lys | cta Leu | aaa Lys | gat Asp | aat Asn 125 | cat His | gca Ala | cag Gln | 384 |
| ctt Leu | ggt Gly 130 | Ile | cag Gln | ggc | gtt Val | act Thr 135 | gat (Asp | gaa Glu | aat Asn | gca Ala | aaa Lys 140 | aaa Lys | gct Ala | att Ile | tta Leu | 432 |
| aaa Lys 145 | Ala | aat Asn | gca Ala | gcg Ala | ggt Gly 150 | гаг | gat Asp | aag Lys | ggc | gtt Val 155 | . 010 | a gaa 1 Glu | ctt Leu | gaa Glu | aag Lys 160 | 480 |
| ttg Leu | tcc Ser | gga Gly | tca Ser | tta Leu 165 | GIU | agc Ser | tta Leu | tca Ser | aaa Lys 170 | HIC | a gct a Ala | a aaa a Lys | gag Glu | atg Met 175 | | 528 |
| gct Ala | aat Asr | tca Ser | gtt Val | . Lys | gaç Glu | r ctt Leu | aca Thr | agc Sei 185 | LIC | gtt Val | gto l Vai | c cat l His | ggt Gly 190 | , | aat Asn | 576 |
| tca Ser | ggt Gly | ggg Gly 195 | / Asp | tct Ser | gca Ala | tct Ser | act Thi | . ASI | t cot | t gaf o Asj | t ga p Gl | g tct u Sei 20! | | a aaa a Lys | a gga s Gly | 624 |
| cct Pro | aat Ası 210 | n Lei | aco ı Thi | c gta c Val | a ata L Ile | a ago e Sei 215 | ту: | a aaa s Ly: | a ati | ac e Th | a ga r As 22 | p se. | t aa r Asi | t gca n Ala | a ttt a Phe | 672 |
| tta Lei 22 | Le ا | g gci u Ala | t gto | g aaa l Ly: | a ga s Gl | ı va. | ga l Gl | g gc | t tt a Le | g ct u Le 23 | 4 20 | a tc r Se | t at r Il | a gat e Asj | t gaa p Glu 240 | |
| ct. | t tc u Se | t aa r Ly | a gc s Al | t at a Il 24 | e GI | t aaa y Ly | a aa s Ly | a at s Il | a aa e Ly 25 | 5 A5 | t ga n As | t gg p Gl | t ac y Th | t tt r Le 25 | a gat u Asp 5 | 768 |

NSSETE NEISIN

| aac gaa gc Asn Glu Al | a aat a Asn 260 | cga aac Arg Asn | gaa Glu | Ser | ttg Leu 265 | ata Ile | gca Ala | gga Gly | gct Ala | tat Tyr 270 | gaa Glu | ata Ile | 816 |
|---|--|---|---------------------------------------|--|--|--|---|--|---------------------------------------|--|--|---------------------------------------|------|
| tca aaa ct Ser Lys Le 27 | ı Ile : | ada caa Thr Gln | Lys | tta Leu 280 | agt Ser | gta Val | ttg Leu | aat Asn | tca Ser 285 | gaa Glu | gaa Glu | tta Leu | 864 |
| aag aaa aa Lys Lys Ly 290 | a att a s Ile 1 | aaa gag Lys Glu | gct Ala 295 | aag Lys | gat Asp | tgt Cys | tcc Ser | caa Gln 300 | aaa Lys | ttt Phe | act Thr | act Thr | 912 |
| aag cta aa Lys Leu Ly 305 | a gat a s Asp : | agt cat Ser His 310 | gca Ala | gag Glu | ctt Leu | ggt Gly | ata Ile 315 | caa Gln | agc Ser | gtt Val | cag Gln | gat Asp 320 | 960 |
| gat aat go Asp Asn Al | a Lys : | aaa gct Lys Ala 325 | att | tta Leu | aaa Lys | aca Thr 330 | cat His | gga Gly | act Thr | aaa Lys | gac Asp 335 | aag Lys | 1008 |
| ggt gct aa Gly Ala Ly | a gaa s Glu 340 | ctt gaa Leu Glu | gag Glu | tta Leu | ttt Phe 345 | aaa Lys | tca Ser | cta Leu | gaa Glu | agc Ser 350 | ttg Leu | tca Ser | 1056 |
| aaa gca gc Lys Ala Al 35 | a Gln | gca gca Ala Ala | tta Leu | Thr 360 | aat Asn | tca Ser | gtt Val | aaa Lys | gag Glu 365 | ctt Leu | aca Thr | aat Asn | 1104 |
| cct gtt gt Pro Val Va 370 | g gca l Ala | gaa agt Glu Ser | cca Pro 375 | aaa Lys | aaa Lys | cct Pro | taa * | | | | | | 1137 |
| 0.0 | | | 575 | | \ | | | | | | | | |
| <210> 54 <211> 378 <212> PRT <213> osp0 | : Chime | era | 373 | | | \ | | | | | | | |
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| <210> 54 <211> 378 <212> PRT <213> ospo <400> 54 Met Ala Cy 1 Ala Asp Gi Ile Thr As 3! Leu Leu Se | s Asn u Ser 20 p Ser | Asn Ser 5 Val Lys Asn Ala | Gly Gly Val | Pro Leu 40 | Asn 25 Leu | leu Ala | Thr | Glu Lys Ile | Ile Glu 45 | Ser 30 Val | Lys Glu | Lys Ala | |
| <210> 54 <211> 378 <211> 378 <212> PRT <213> ospo <400> 54 Met Ala Cy 1 Ala Asp Gi Ile Thr As 3! Leu Leu So 50 Lys Asn As | s Asn u Ser 20 sp Ser er Ser | Asn Ser 5 Val Lys Asn Ala Ile Asp | Gly Gly Val Glu 55 | Pro Leu 40 Leu | Asn 25 Leu Ala | leu Ala Lys | Thr Val | Glu Lys Ile 60 | Ile Glu 45 Gly | Ser 30 Val Lys | Lys Glu Lys | Lys Ala Ile | |
| <210> 54 <211> 378 <211> 378 <212> PRT <213> ospo <400> 54 Met Ala Cy 1 Ala Asp Gi Ile Thr As 31 Leu Leu Sc 50 Lys Asn As 65 Leu Ala Gi | ss Asn u Ser 20 sp Ser er Ser sp Gly | Asn Ser 5 Val Lys Asn Ala Ile Asp Ser Let 70 Tyr Thr | Gly Gly Val Glu 55 Asp | Pro Leu 40 Leu Asn Ser | Asn 25 Leu Ala Glu Thr | Ala Lys Ala Leu 90 | Thr Val Ala Asn 75 | Glu Lys Ile 60 Arg | Ile Glu 45 Gly Asn Gln | Ser 30 Val Lys Glu Lys | Lys Glu Lys Ser Leu 95 | Lys Ala Ile Leu 80 Ser | |
| <210> 54 <211> 378 <211> 378 <212> PRT <213> ospo <400> 54 Met Ala Cy 1 Ala Asp Gi Ile Thr As 31 Leu Leu Sc 50 Lys Asn As 65 Leu Ala Gi Lys Leu A | ss Asn u Ser 20 sp Ser er Ser sp Gly y Ala sn Gly 100 | Asn Ser 5 Val Lys Asn Ala Ile Asp Ser Let 70 Tyr Thr 85 Ser Glt | Gly Val Glu 55 Asp Ile | Pro Leu 40 Leu Asn Ser Leu | Asn 25 Leu Ala Glu Thr Lys 105 | Leu Ala Lys Ala Leu 90 Glu | Thr Val Ala Asn 75 Ile | Glu Lys Ile 60 Arg Thr | Ile Glu 45 Gly Asn Gln Ala | Ser 30 Val Lys Glu Lys Ala 110 | Lys Glu Lys Ser Leu 95 Ala | Lys Ala Ile Leu 80 Ser Lys | |
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Leu Ser Gly Ser Leu Glu Ser Leu Ser Lys Ala Ala Lys Glu Met Leu
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                                    170
                                                         175
Ala Asn Set Val Lys Glu Leu Thr Ser Pro Val Val His Gly Asn Asn
                                 185
                                                     190
Ser Gly Gly Asp Ser Ala Ser Thr Asn Pro Asp Glu Ser Ala Lys Gly
                            200
                                                 205
        195
Pro Asn Leu Thr Val Ile Ser Lys Lys Ile Thr Asp Ser Asn Ala Phe
                        215
                                             220
Leu Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu
                                         235
                    230
Leu Ser Lys AlaackslashIle Gly Lys Lys Ile Lys Asn Asp Gly Thr Leu Asp
                                     250
                245
Asn Glu Ala Asn Arg Asn Glu Ser Leu Ile Ala Gly Ala Tyr Glu Ile
                                                     270
                                 265
Ser Lys Leu Ile That Gln Lys Leu Ser Val Leu Asn Ser Glu Glu Leu
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                                                 285
Lys Lys Lys Ile Lys \Glu Ala Lys Asp Cys Ser Gln Lys Phe Thr Thr
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                                             300
Lys Leu Lys Asp Ser His Ala Glu Leu Gly Ile Gln Ser Val Gln Asp
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Gly Ala Lys Glu Leu Glu Glu Leu Phe Lys Ser Leu Glu Ser Leu Ser
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qct gat gag tct gtt aaa ggg cct aat ctt\aca gaa ata agt aaa aaa
                                                                    96
Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys
                                  25
att acg gat tot aat gog gtt tta ott got gtbg aaa gag gtt gaa gog
                                                                    144
Ile Thr Asp Ser Asn Ala Val Leu Leu Ala Val Lys Glu Val Glu Ala
ttg ctg tca tct ata gat gaa att gct gct aaa gct att ggt aaa aaa
                                                                    192
Leu Leu Ser Ser Ile Asp Glu Ile Ala Ala Lys Ala Ile Gly Lys Lys
     50
                                                                    240
ata cac caa aat aat ggt ttg gat acc gaa tat aat cac aat gga tca
Ile His Gln Asn Asn Gly Leu Asp Thr Glu Tyr Asn Ais Asn Gly Ser
                     70
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| | , | \ | | | | | | | | | | | | | | |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----|
| ttg Leu | tta Leu | gcg Ala | gga Gly | gct Ala 85 | tat Tyr | gca Ala | ata Ile | tca Ser | acc Thr 90 | cta Leu | ata Ile | aaa Lys | caa Gln | aaa Lys 95 | tta Leu | 288 |
| gat Asp | gga Gly | ttg\ Leu | aaa Lys 100 | aat Asn | gaa Glu | gga Gly | tta Leu | aag Lys 105 | gaa Glu | aaa Lys | att Ile | gat Asp | gcg Ala 110 | gct Ala | aag Lys | 336 |
| aaa Lys | tgt Cys | tct Ser 115 | gala Glu | aca Thr | ttt Phe | act Thr | aat Asn 120 | aaa Lys | tta Leu | aaa Lys | gaa Glu | aaa Lys 125 | cac His | aca Thr | gat Asp | 384 |
| ctt Leu | ggt Gly 130 | aaa Lys | gaa Glu | ggt Gly | gtt Val | act Thr 135 | gat Asp | gct Ala | gat Asp | gca Ala | aaa Lys 140 | gaa Glu | gcc Ala | att Ile | tta Leu | 432 |
| aaa Lys 145 | aca Thr | aat Asn | ggt Gly | act Thr | aaa Lys 150 | act Thr | aaa Lys | ggt Gly | gct Ala | gaa Glu 155 | gaa Glu | ctt Leu | gga Gly | aaa Lys | tta Leu 160 | 480 |
| ttt Phe | gaa Glu | tca Ser | gta Val | gag Glu 165 | gtc Val | ttg Leu | tca Ser | aaa Lys | gca Ala 170 | gct Ala | aaa Lys | gag Glu | atg Met | ctt Leu 175 | gct Ala | 528 |
| aat Asn | tca Ser | gtt Val | aaa Lys 180 | gag Glu | ctt Leu | aca Thr | agc Ser | cct Pro 185 | gtt Val | gtg Val | gca Ala | gaa Glu | agt Ser 190 | cca Pro | aaa Lys | 576 |
| aaa Lys | cct Pro | ttc Phe 195 | cat His | ggt Gly | aat Asn | aat Asn | tca Ser 200 | ggt Gly | ggg Gly | gat Asp | tct Ser | gca Ala 205 | tct Ser | act Thr | aat Asn | 624 |
| cct Pro | gat Asp 210 | gag Glu | tct Ser | gca Ala | aaa Lys | gga Gly 215 | cct Pro | aat Asn | ctt Leu | acc Thr | gta Val 220 | ata Ile | agc Ser | aaa Lys | aaa Lys | 672 |
| att Ile 225 | Thr | gat Asp | tct Ser | aat Asn | gca Ala 230 | ttt Phe | tta Leu | ct q Leu | gct Ala | gtg Val 235 | aaa Lys | gaa Glu | gtt Val | gag Glu | gct Ala 240 | 720 |
| ttg Leu | ctt Leu | tca Ser | tct Ser | ata Ile 245 | gat Asp | gaa Glu | ctt Leu | tct Ser | aaa Lys 250 | Ala | att Ile | ggt Gly | aaa Lys | aaa Lys 255 | ata Ile | 768 |
| aaa Lys | aat Asn | gat Asp | ggt Gly 260 | act Thr | tta Leu | gat Asp | aac Asn | gaa Glu 265 | gca Ala | aat Asn | cga Arg | aac Asn | gaa Glu 270 | tca Ser | ttg Leu | 816 |
| ata Ile | gca Ala | gga Gly 275 | Ala | tat Tyr | gaa Glu | ata Ile | tca Ser 280 | Lys | cta Leu | ata Ile | aca Thr | caa Gln 285 | aaa Lys | tta Leu | agt Ser | 864 |
| gta Val | ttg Leu 290 | Asn | tca Ser | gaa Glu | gaa Glu | tta Leu 295 | Lys | aaa Lys | aaa Lys | att Ile | aaa Lys 300 | G Tu | gct Ala | aag Lys | gat Asp | 912 |

Sub A!

| | | 1 | | | | | | | | | | | | | | |
|--|--|--|---|--|---|---|--|---|---|---|---|---|---|--|---|------|
| tgt Cys 305 | tcc Ser | caa Gln | aaa Lys | ttt Phe | act Thr 310 | act Thr | aag Lys | cta Leu | aaa Lys | gat Asp 315 | agt Ser | cat His | gca Ala | gag Glu | ctt Leu 320 | 960 |
| ggt Gly | ata Ile | caa Gln | agc Ser | gtt Val 825 | cag Gln | gat Asp | gat Asp | aat Asn | gca Ala 330 | aaa Lys | aaa Lys | gct Ala | att Ile | tta Leu 335 | aaa Lys | 1008 |
| | | | | | gac Asp | | | | | | | | | | | 1056 |
| aaa Lys | tca Ser | cta Leu 355 | gaa Glu | agc Ser | ttg Neu | tca Ser | aaa Lys 360 | gca Ala | gcg Ala | caa Gln | gca Ala | gca Ala 365 | tta Leu | act Thr | aat Asn | 1104 |
| tca Ser | gtt Val 370 | aaa Lys | gag Glu | ctt Leu | aca Thr | aat Asn 375 | cct Pro | gtt Val | gtg Val | gca Ala | gaa Glu 380 | agt Ser | cca Pro | aaa Lys | aaa Lys | 1152 |
| cct Pro 385 | taa * | | | | | | | | | | | | | | | 1158 |
| <211 <212 |)> 56 .> 38 ?> PI 3> os | 3 4 | Chime | era | | ` | | | | | | | | | | |
| | > 56 | | 70 | 0 | G1 | T | 7 | \ _1 | 7. ~ ~ | mh | Com | 70.10 | 7.00 | Cor | 71- | |
| 1 | _ | | | 5 | Gly | | | \ | 10 | | | | | 15 | | |
| Asp | Glu | Ser | Val 20 | Lys | Gly | Pro | Asn | Leu 25\ | Thr | Glu | Ile | Ser | Lys 30 | Lys | Ile | |
| Thr | Asp | | Asn | Ala | Val | Leu | Leu 40 | Ala | Val | Lys | Glu | _ | Glu | Ala | Leu | |
| Leu | Ser | 35 | | | | | | | | | | 15 | | | | |
| | 50 | Ser | Ile | Asp | Glu | Ile 55 | | Ala | ys | Ala | Ile 60 | 45 Gly | Lys | Lys | Ile | |
| | 50 | | | | Leu | 55 | Ala | | \ | Asn | 60 | Gly | | | Leu | |
| 65 | 50 Gln | Asn | Asn | Gly | | 55 Asp | Ala Thr | Glu | Tyr | Asn 75 | 60 His | Gly Asn | Gly | Ser | Leu 80 | |
| 65 Leu | 50 Gln Ala | Asn Gly | Asn Ala Asn | Gly Tyr 85 | Leu 70 | 55 Asp Ile | Ala Thr Ser | Glu Thr Glu | Tyr Leu 90 | Asn 75 Ile | 60 His Lys | Gly Asn Gln | Gly Lys Ala | Ser Leu 95 | Leu 80 Asp | |
| 65 Leu Gly | 50 Gln Ala Leu | Asn Gly Lys | Asn Ala Asn 100 | Gly Tyr 85 Glu | Leu 70 Ala | 55 Asp Ile Leu | Ala Thr Ser Lys | Glu Thr Glu 105 | Tyr Leu 90 Lys | Asn 75 Ile | 60 His Lys Asp | Gly Asn Gln Ala | Gly Lys Ala 110 | Ser Leu 95 Lys | Leu 80 Asp Lys | |
| 65 Leu Gly Cys | 50 Gln Ala Leu Ser Lys | Asn Gly Lys Glu 115 | Asn Ala Asn 100 Thr | Gly Tyr 85 Glu Phe | Leu 70 Ala Gly | 55 Asp Ile Leu Asn Asp | Ala Thr Ser Lys Lys | Glu Thr Glu 105 Leu | Tyr Leu 90 Lys | Asn 75 Ile Ile Glu | 60 His Lys Asp Lys | Gly Asn Gln Ala His 125 | Gly Lys Ala 110 Thr | Ser Leu 95 Lys Asp | Leu 80 Asp Lys Leu | |
| 65 Leu Gly Cys Gly Thr | 50 Gln Ala Leu Ser Lys 130 | Asn Gly Lys Glu 115 Glu | Asn Ala Asn 100 Thr | Gly Tyr 85 Glu Phe Val | Leu 70 Ala Gly Thr Thr | 55 Asp Ile Leu Asn Asp 135 | Ala Thr Ser Lys Lys 120 Ala | Glu Thr Glu 105 Leu Asp | Tyr Leu 90 Lys Lys | Asn 75 Ile Ile Glu Lys | 60 His Lys Asp Lys Glu 140 | Gly Asn Gln Ala His 125 Ala | Gly Lys Ala 110 Thr | Ser Leu 95 Lys Asp Leu | Leu 80 Asp Lys Leu Lys Phe | |
| 65 Leu Gly Cys Gly Thr 145 | 50 Gln Ala Leu Ser Lys 130 Asn | Asn Gly Lys Glu 115 Glu Gly | Asn Ala Asn 100 Thr Gly Thr | Gly Tyr 85 Glu Phe Val Lys Val | Leu 70 Ala Gly Thr | 55 Asp Ile Leu Asn Asp 135 Lys | Ala Thr Ser Lys 120 Ala Gly | Glu Thr Glu 105 Leu Asp Ala | Tyr Leu 90 Lys Lys Ala Glu Ala | Asn 75 Ile Ile Glu Lys Glu 155 | 60 His Lys Asp Lys Glu 140 Deu | Gly Asn Gln Ala His 125 Ala Gly | Gly Lys Ala 110 Thr Ile Lys | Ser Leu 95 Lys Asp Leu Leu Ala | Leu 80 Asp Lys Leu Lys Phe 160 | |
| 65 Leu Gly Cys Gly Thr 145 Glu | 50 Gln Ala Leu Ser Lys 130 Asn | Asn Gly Lys Glu 115 Glu Gly Val | Asn Ala Asn 100 Thr Gly Thr Glu Glu | Gly Tyr 85 Glu Phe Val Lys Val 165 | Leu 70 Ala Gly Thr Thr | 55 Asp Ile Leu Asn Asp 135 Lys Ser | Ala Thr Ser Lys 120 Ala Gly Lys | Glu Thr Glu 105 Leu Asp Ala Ala Val | Tyr Leu 90 Lys Lys Ala Glu Ala 170 | Asn 75 Ile Ile Glu Lys Glu 155 Lys | 60 His Lys Asp Lys Glu 140 Deu | Gly Asn Gln Ala His 125 Ala Gly Met | Gly Lys Ala 110 Thr Lys Leu Pro | Ser Leu 95 Lys Asp Leu Leu Ala 175 | Leu 80 Asp Lys Leu Lys Phe 160 Asn | |
| 65 Leu Gly Cys Gly Thr 145 Glu Ser | 50 Gln Ala Leu Ser Lys 130 Asn Ser Val | Asn Gly Lys Glu 115 Glu Gly Val Lys His | Asn Ala Asn 100 Thr Gly Thr Glu Glu 180 | Gly Tyr 85 Glu Phe Val Lys Val 165 Leu | Leu 70 Ala Gly Thr Thr 150 Leu | 55 Asp Ile Leu Asn Asp 135 Lys Ser Ser | Ala Thr Ser Lys 120 Ala Gly Lys Pro Gly | Glu Thr Glu 105 Leu Asp Ala Ala Val 185 | Tyr Leu 90 Lys Lys Ala Glu Ala 170 Val | Asn 75 Ile Glu Lys Glu 155 Lys | 60 His Lys Asp Lys Glu 140 Deu Glu | Gly Asn Gln Ala His 125 Ala Gly Met Ser | Gly Lys Ala 110 Thr Lys Leu Pro 190 | Ser Leu 95 Lys Asp Leu Leu Ala 175 Lys | Leu 80 Asp Lys Leu Lys Phe 160 Asn | |
| Gly Cys Gly Thr 145 Glu Ser | 50 Gln Ala Leu Ser Lys 130 Asn Ser Val Phe | Asn Gly Lys Glu 115 Glu Gly Val Lys His 195 | Asn Ala Asn 100 Thr Gly Thr Glu Glu 180 Gly | Gly Tyr 85 Glu Phe Val Lys Val 165 Leu Asn | Leu 70 Ala Gly Thr Thr 150 Leu | 55 Asp Ile Leu Asn Asp 135 Lys Ser Ser | Ala Thr Ser Lys 120 Ala Gly Lys Pro Gly 200 | Glu Thr Glu 105 Leu Asp Ala Ala Val 185 Gly | Leu 90 Lys Lys Ala Glu Ala 170 Val | Asn 75 Ile Glu Lys Glu 155 Lys Ala Ser | 60 His Lys Asp Lys Glu 140 Deu Glu Ala | Gly Asn Gln Ala His 125 Ala Gly Met Ser Ser 205 | Gly Lys Ala 110 Thr Ile Lys Leu Pro 190 Thr | Ser Leu 95 Lys Asp Leu Leu Ala 175 Lys Asn | Leu 80 Asp Lys Leu Lys Phe 160 Asn Lys | |

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|------------|------------------------------|---------------------|------------------|----------------|----------------------|----------------|---------------|----------------------|----------|-------------|------------------|--------------------|----------------------|--------------|------------|------------|---------------|----------------|------------------|-----|
| | | | | | Ala | | | | | | | | | | | | | | | |
| 225 Leu | Ser | Se | r \ | le | Asp | Glu | Leu | Ser | ΓŻ | ys i | Ala 250 | Ile | Gly | Lys | s L | ys | 11e 255 | L | ys | |
| | | | | | 245 Leu | | | | | la i | Asn | | | | | | | | | |
| | | | a T | | Glu | | | | Le | eu | | | | | | | | | | |
| | | Se | r G | | gla | | | | | | | | | | | | | | | |
| | | Ly | | | That | | Lys | Leu | | | | | | | | | | | | |
| | | | | | Gln 325 | Asp | | | | | | | | | | | | | | |
| His | Gly | Th | r I | Lys 340 | Asp | Lys | Gly | Ala | a L 3 | ys 45 | Glu | Leu | Glu | Gl | u I | Leu 350 | Phe | e L | ys | |
| | | | u s | Ser | Leu | | | | a A | la | | | | | | | | | | |
| Val | Lys 370 | | u] | Leu | Thr | Asn | Arc 3 7 5 | Va: | ĺν | 'al | Ala | Glu | Ser 380 | Pr | o I | Lys | Lys | 3 F | ro | |
| <21 <21 | 0> ! 1> : 2> ! 3> (| 116: ONA | | him | era | | | | \ | | | | | | | | | | | |
| | 0> 21> 22> | | | (11 | .61) | | | | \ | \ | | | | | | | | | | |
| t t | 0> g tg Cy | | gt e r | aat Asr | tca Sei 5 | a ggg | g aa y Ly | a gg s Gl | t o | Gly ggg | gat Asp 10 | , 50. | t gc r Al | a to a So | ct er | act Thr | aa As 1 | t n 5 | cct Pro | 48 |
| Ala | a As | рG | lu | Sei 20 | | а ГУ | s GI | у ы | . 0 | 25 | TIE (| 1/ | 1 01 | u . | | 3(|) _1 | | - | 96 |
| Ile | e Th | r A | .sp 35 | Se | t aa r As: | n Al | a Pn | ie va | 10 | ьеч | LAT | a vu | 1, | | 45 | | | | | 144 |
| tt | u Va | t t al I | ta Leu | tc Se | t at r Il | a ga e As | b er | ia ct .u Le 55 | tt eu | gct Ala | aa Ly | g aa s Ly | | a I | tt le | gg Gl | t ca y GI | aa Ln | aaa Lys | 192 |
| Il | a ga e As | ac a sp <i>l</i> | aat Asn | aa As | t aa n As | n GI | t tt y Le | a g eu A | ct la | gct Ala | tt a Le | u As | nt aa sn As 75 | at c | ag Gln | aa As | t go n G | ga Ly | tcg Ser 80 | 240 |
| tt Le | g t | ta (eu <i>l</i> | gca Ala | gg G1 | a go y Al | c ta a Ty | it go /r A | ca a la I | ta le | t ca Sea | F 111 | c ct r Le 10 | a at eu I | ta a le 1 | ack Thi | ga Gl | | aa ys 95 | ttg Leu | 288 |
| a g | gt a er L | aa ys | ttg Leu | aa Ly 10 | aa aa /s As)0 | it tt sn Le | a g eu G | aa g lu G | aa lu | tta Le | ս բչ | ig ao | ca g hr G | aa a lu : | att Ile | 90 A) | a a a L | ag ys | gct Ala | 336 |
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|-------------------|--|---|---|---|---|--|--|--|--|--|---|--|---|---|--|
| | | | | | | | | | | | | | | | 384 |
| | | | | | | | | | | | | | | | 432 |
| | | | | | | | | | | | | | | | 480 |
| | | | | | | | | | | | | | | | 528 |
| | | | | | | | | | | | | | | | 576 |
| | | | | | | | | | | | | | | | 624 |
| | | | | | | | | | | | | | | | 672 |
| | | | | | | | | | | | | | | | 720 |
| ttg Leu | ctt Leu | tca Ser | tct Ser 245 | ata Ile | gat Asp | gaa Glu | ctt Leu | tct Ser 250 | aaa Lys | gct Ala | att Ile | ggt Gly | aaa Lys 255 | aaa Lys | 768 |
| | | | | | | | | | | | | | | | 816 |
| | | | | | | | | | | | | | | | 864 |
| gta Val 290 | ttg Leu | aat Asn | tca Ser | gaa Glu | gaa Glu 295 | tta Leu | aag Lys | aaa Lys | aaa Lys | att 11e 300 | aaa Lys | gag Glu | gct Ala | aag Lys | 912 |
| | | | | | | | | | | | | | | | 960 |
| | | | | | | | | | | | | | | | 1008 |
| | cttuli30 aaaa Lys tthe aath Asn augs ccto210 atte ttgu aaaa Lys atte gtal290 tgs ggt | Lys Cys 115 ctt ggc Gly 130 aaa aca Thr ttt gaa Thr ttt gaa Cct Glu aat tcar aaa cct Pro5 cct gat Pro 210 att aca Thr ttg Ctt Leu aaa aat Lys Asn att gca Ala 275 gta ttg Yal tgt tcc ggt ata | Lys Cys Ser 115 Ctt ggc aaa Leu Gly Lys 130 aaa aca cat Cat Thr His ttt gaa tca gtt Val 180 aaa cct cat Val 180 aaa cct cat Lys Pro His 195 Cct gat gag Pro Asp Glu 210 att aca gat Ile Thr Asp ttg ctt tca Leu Ser aaa aat gat Lys Asn Asp 260 ata gca gga gal gal gal Ser att tca Cat Cat Cat Cat Cat Cat Cat Cat Cat Ca | Lys Cys Ser Glu ctt ggc aaa cag Leu Gly Lys Gln 130 aaa aca Cat gca Lys Thr His Ala ttt gaa tca gtt aaa Asn Ser Val 180 aaa cct cat atg Lys 180 cct gat gag tct Pro Asp Glu Ser 210 att aca gat tct Ile Thr Asp Ser ttg ctt tca tct Leu Ser 245 aaa aat gat ggt Lys Asn Asp Gly 260 ata gca gga gct Ile Ala Gly Ala 275 gta ttg aat tca Val Leu Asn Ser ggt ata caa agc Gly ata caa agc Gly ata caa agc Gly ggt ata caa agc Gly ggt ata caa agc Gly ggt ata caa agc | Lys Cys Ser Glu Glu ctt ggc aaa cag gat Leu Gly Lys Gln Asp 130 aaa aca cat gca act Lys Thr His Ala Thr 150 ttt gaa tca gta gaa Asn Ser Val aaa gaa Asn Ser Val Lys Glu aaa cct cat atg gca Asn 180 cct gat gag tct gca Pro Asp Glu Ser Ala att aca gat tct aat Ile Thr Asp Ser Asn 230 ttg ctt tca tct ata Leu Ser Ser Ile 245 aaa aat gat ggt act Lys Asn Asp Gly Thr 260 ata gca gga gct tat Ile Ala Gly Ala Tyr 275 gta ttg aat tca gaa Val Leu Asn Ser Glu cgt tcc caa aaa ttt Cys Ser Gln Lys Phe 310 ggt ata caa agc gtt Gly Ile Gln Ser Val | Lys Cys Ser Glu Glu Phe Ctt ggc aaa cag gat gct Leu Gly Lys Gln Asp Ala 130 aaa aca cat gca act acc Lys Thr His Ala Thr 150 ttt gaa tca gta gaa ggt Phe Glu Ser Val Glu Gly 165 aat tca gtt aaa gaa ctt Asn Ser Val Lys Glu Leu 180 cct gat gag tct gca aaa Pro Asp Glu Ser Ala Lys 210 cct gat gag tct gca aaa Pro Asp Glu Ser Ala Lys 210 att aca gat tct aat gca Ile Thr Asp Ser Asn Ala 230 ttg ctt tca tct ata gat Leu Ser Ser Ile Asp 245 aaa aat gat ggt act tta Leu Leu Ser Ser Ile Asp 245 aaa aat gat ggt act tta Lys Asn Asp Gly Thr Leu 260 ata gca gga gct tat gaa Ile Ala Gly Ala Tyr Glu gta ttg aat tca gaa gaa Val Leu Asn Ser Glu Glu 290 tgt tcc caa aaa ttt act ggt ata caa agc gtt cag Gly Ile Gln Ser Val Cap Gly Ile Gln Ser Val Cap | Lys Cys Ser Glu Glu Phe Thr 120 ctt ggc aaa cag gat gct acc Leu Gly Lys Gln Asp Ala Thr 135 aaa aca cat gca act acc gat Thr His Ala Thr 135 ttt gaa tca gta gaa ggt ttg Phe Glu Ser Val Lys Glu Gly Leu 165 aat tca gtt aaa gaa ctt aca Asn Ser Val Lys Glu Leu Thr 180 cct gat gag tct gca aaa gga ctt aca Asn 195 cct gat gag tct gca aaa gga Pro Asp Glu Ser Ala Lys Gly 215 att aca gat tct gca aaa gga ttt Ile Thr Asp Ser Ala Lys Gly 215 att aca gat tct aaa gga gga ttt Ile Thr Asp Ser Ala Lys Gly 215 att gct tca tca tct ata gat gaa Leu Leu Ser Ser Ile Asp Glu 245 aaa aat gat ggg act tta gaa gaa Leu Asp 260 ct gat gag gct tat gaa gaa tta Ser Ser Ile Asp Glu Ile Ile Zeo gta ttg aat caa gga gct tat gaa ata Ile Asp 260 gta ttg aat tca gaa tta Caa gaa gaa tta Caa gat Ile Zeo gta ttg aat caa agc gtt cag gat Gly Ile Gln Asp | Lys Cys Ser Glu Glu Phe Thr Asn 120 Ctt ggc aaa cag gat gct acc gat Leu Gly Lys Gln Asp Asp Ala Thr Asp 135 Thr Asp 135 Thr His Ala Thr Thr Asp Lys 150 Ctt gaa tca gtt aaa ggt ttg Leu Leu 165 Glu Gly Leu Leu 165 Asp 180 Ctt aca agt Asn Ser Val Lys Glu Leu Thr Ser 185 Asp 210 Ser 180 Ctt Asp 215 Gly Pro 210 Asp Glu Ser Ala Lys Gly Pro 210 Asp 215 Gly Pro 210 Asp 260 Ctt Asp 26 | Lys Cys Ser Glu Glu Phe Thr Asn Lys 120 Ctt ggc aaa cag gat gct acc gat gat Leu Gly Lys Gln Asp Ala Thr Asp Asp Asp 135 aaa aca cat gca act acc gat aaa ggt Lys Thr His Ala Thr Thr Thr Asp Lys Gly 150 ttt gaa tca gta aaa ggt ttg tta aaa Phe Glu Ser Val Glu Leu Thr Ser Pro 185 aaa cct cat at Lys Glu Leu Thr Ser Pro 185 aaa cct cat at Asn Ser Glu Ser Ala Lys Gly Pro Asn 210 cct gat gag tct gca aaa aat tca ggt Asp Asp Asp 210 ctt aca gat tct aaa gga act act gly Pro Asn 210 att aca gat tct aat gaa gaa ctt ta cag gt Pro Asp 210 att aca gat tct aat gca ttt ta ctg Ite Thr Asp Ser Ser Ala Lys Gly Pro Asn 210 aaa aat gct tca tct at gaa gaa ctt tct Leu Leu Ser 245 aaa aat gat ggt act tta gaa aac gaa Lys Asn Asp Asp Gly Thr Leu Asp Asp 265 gta ttg aat tca gaa gaa ttt gaa ata tca aag Ite Ala Gly Ala Tyr Glu Leu Leu Lys Lys 290 tgt tcc caa aaa ttca gaa gaa tta aag aaa Gly Leu Asp Asp Asp Asp Asp Asp Asp Asp Asp Asp | Lys Cys Ser Glu Glu Phe Thr Asn Lys Leu 1120 ctt ggc aaa cag gat gct acc gat gat cat Leu Gly Lys Gln Asp Ala Thr Asp Asp His 1335 aaa aca cat gat gaa ggt ttg tta aaa gca Phe Glu Ser Val 165 ctt gaa tca gtt aaaa ggt Glu Lys Gly Leu Leu Lys Ala 170 aaa tca gtt aaaa gaa ctt acc acc ggt ggc Lys Pro His Met Ala Asn Asn Ser Gly Gly 200 cct gat gag tct gca aaa aat tca ggt ggg Lys Pro His Met Ala Asn Asn Ser Gly Gly 200 cct gat gag tct gca aaa gag cct acc ggt ggg Cly Pro Asn Leu 210 att aca gat gag tct gaa aaa gaa ctt tata ctg ggt ggg Cly Pro Asn Leu 210 att aca gat tct aca tct acc ggt Asn Ala Phe Leu Leu Ala 235 ttg ctt tca tct ata ggt as ctt tata gat gaa ctt tct aaa Lys 255 ttg ctt tca tct ata ggt acc tta gat acc gaa gca Lys Asn Asp 265 aaa aat gat ggt act tta gaa ata tca aac gaa gca Lys Asn Asp 265 ata gca gga gct tat gaa ata tca aac gaa gca Ct Ala Cys 275 gta ttg aat tca aaa tca gat gaa ata tca aaa cta Cty 275 gta ttg ccc caa aaa tca gat gaa ctt aaa aac cta Cys Ser Glu Lys 295 tgt tcc caa aaa tca gc gat gat aat acc aaa cys Ser Cys Ser Gln Lys Phe Thr Thr Lys Leu Lys 315 ggt ata caa agc gtt cag gat gat aat gca aac Gly Ile Gln Ser Val Gln Asp Asp Asp Asp Asn Ala | Lys Cys Ser Glu Glu Phe Thr Asn Lys Leu Lys 115 Ctt ggc aaa cag gat gat acc gat gat cat gca Leu Gly Lys Cln Asp Ala Thr Asp Asp His Ala 135 Ett gaa cat gca act acc gat gat gat aaa ggt gct aaa Lys Thr His Ala Thr Thr Asp Lys Gly Ala Lys 155 Ett gaa tca gta gaa ggt ttg tta aaa gca gct Phe Glu Ser Val 165 Ett gaa tca gta aaa ggt ttg Leu Leu Lys Ala Lys 165 Ett gaa tca gta aaa gaa ctt aca agt cct gta Asn Ser Val Lys Glu Leu Thr Ser Pro Val Val 180 East cct gat atg gct aaa aat tca ggt ggg gat Lys Pro Asp 195 Ect gat gag tct gca aaa gaa cct acc ggt ggg gat Asp Asp Asp Asp Asp Asp Asp Asp Asp Asp | Lys Cys Ser Glu Glu Phe Thr Asn Lys Leu Lys Ser 125 Ctt ggc aaa cag gat gat acc gat gat gat cat gca aaa Leu Gly Lys Gln Asp Ala Thr Asp Asp His Ala Lys 130 aaa aca cat gca act acc gat gat gat Gly Ala Lys Glu 150 ttt gaa tca gta aaa gaa gtt tg tta aaa gca gct caa Phe Glu Ser Val Glu Gly Leu Leu Lys Ala Ala Thr Thr Asp Asp Lys Gly Ala Lys Glu 165 aat tca gtt aaa gaa gat ct aca agt cct gtt gta Asn Ser Val Lys Glu Leu Thr Ser Pro Val Val Ala Clys 195 cct gat gag tct gca aaa aaa gga cct ggg ggg gat tct Lys Pro Asp Glu Ser Ala Lys Gl Pro Asp Glu Ser Ala Lys Gl Pro Asn Leu Thr Val 210 cct gat gag tct gca aaa gga cct aat ctt acc ggt ggg gat tct Pro Asp Glu Ser Ala Lys Gl Pro Asn Leu Thr Val 220 cct gat gag tct gca aaa gga cct aat ctt acc ggt grow Asp Ser Gly Gly Asp Ser Gly Clys Asp Ser Ile Asp Glu Leu Eu Cu Ala Val Lys 235 ttg ctt tca tct ata gat gaa gtt tta Asp Asp Asp Asp Asp Asp Ser Glu Ala Asp Asp Ser Glu Ala Asp Asp Asp Glu Leu Ser Lys Ala Ile Asp Glu Leu Ser Lys Ala Ile Asp Glu Leu Leu Ser Ser Ile Asp Glu Leu Ser Lys Ala Ile Asp Glu Leu Lys Lys Asp Ser Glu Ala Asp Asp Asp Glu Ala Asp Asp Ser Glu Ala Asp Asp Asp Glu Ala Asp Asp Ser Glu Ala Asp Asp Asp Glu Ala Asp Asp Ser Glu Leu Lys Lys Lys Lys Lys Lys Lys Lys Lys Ser Glu Lys Asp Ser Glu Ala Asp Asp Asp Ser Glu Lys Asp Asp Ser Glu Lys Asp Ser Glu Lys Asp Ser Glu Lys Asp Ser Glu Lys Asp Asp Asp Asp Asp Asp Asp Asp Asp As | Lys Cys Ser Glu Glu Phe Thr Asn Lys Leu Lys Ser Gly 125 Ctt ggc aaa cag gat gct acc gat gat cat gca aaa gca Lys Thr His Ala Thr Thr Asn Lys Glu Phe 155 Ctt gaa acc gat gat gct aca ggat gct aaa gga ttt gaa tca gta gat gct aca ggat gct aca gat gat Lys Glu Phe 155 Ctt gaa tca gta gat ggt ttg tta aaa ggt gct aca gta gta Phe Glu Ser Val 165 Ctt aca agt ctt Lys Ala Lys Glu Phe 160 Ser Val Lys Glu Leu Thr Ser Pro Val Val Ala Glu 190 aaa cct acc gat aca ggt gct gtg gta gct aca gta Phe 180 Ctt aca agt ctg gtg gat tct gta gca gaa ctt Lys Pro His Met Ala Asn Asn Ser Gly Gly Asp Ser Ala 200 Ctt acc act ggt ggg gat tct gca gaa gct lys Pro His Met Ala Asn Asn Ser Gly Gly Asp Ser Ala 200 Ctt acc act ctg gat gat act gca gaa gct lys Gly Pro Asp Glu Ser Ala 215 Ctt gca aca ggt ggg gat tct gca aca gat lys Gly Asp Ser Ala 225 Ctt acc gat gat gat act aca gat gca gat act aca gat gca gat act aca gat gca gct aca gat gca gat act aca gat gca gat act aca gat gca gat act aca gat gca gat gct aca gat gca aca gat gca gat gct gct aca gat gca gat gct gct aca gat gca gat gct aca gat gca gat gct aca gat gca gat gct gct aca gat gca gat gct aca gat gca gat gct gct aca gat gca gat gct gct gct aca gat gca aca gca gat gct gct gct aca gat gca gat gct gct aca gat gca aca gct gct gct gct gct gct gct gct gct gct | Lys Cys Ser Glu Glu Phe Thr Asn Lys Leu Lys Ser Gly His 125 ctt ggc aaa cag gat gct acc gat gat cat gca aaa gca gct Leu Gly Lys Cln Asp Ala Thr Asp Asp His Ala Lys Ala Ala 130 aaa aca cat gca act acc gat aaa ggt gct aca gat lys Lys Clu Phe Lys 150 ttt gaa tca gta gaa ggt ttg tta aaa gca gct caa gta gca Phe Glu Ser Val Gly Leu Leu Lys Ala Ala Cln Val Ala 175 aat tca gtt aaa gaa ctt aca agt lys Gly Ala Lys Glu Phe Lys 180 ttt gaa tca gta gaa ctt aca agt ggt ttg tta aaa gca gct caa gta gca Phe Glu Ser Val Gly Leu Leu Lys Ala Ala Gln Val Ala 176 aat tca gtt aaa gaa ctt aca agt cct gtt gta gca gaa agt Asn Ser Val Lys Glu Leu Thr Ser Pro Val Val Ala Glu Ser Val 180 aaa cct cat atg gct aaa aat tca ggt ggg gat tct gca aaa gta 190 aaa cct gat gag tct gca aaa gaa ctt aca ggt ggg gat tct gca ser Lys Pro His Met Ala Asn Asn Ser Gly Gly Asp Ser Ala Ser 200 cct gat gag tct gca aaa gaa cct aat ctt acc gta ata agc Pro Asp Glu Ser Ala Lys Glv Pro Asn Leu Thr Val Ile Ser 200 att aca gat tct aat gca ttt tta ctg gct ga aaa gaa gtt Ile Thr Asp Ser Ala Phe Leu Leu Ala Val Lys Glu Val 235 aaa aat gat ggt act tta gat gaa ctt tct aaa gct att ggt aaa Leu Leu Ser Ser Ile Asp Glu Leu Ser Lys Ala Ile Gly Lys 245 aaa aat gca ga gct tat gaa ata tca aaa cta ata aca caa aa Ile Ala Gly Ala Tyr Glu Ile Ser Lys Leu Ile Thr Gln Lys 290 gta ttg aat ca gaa gaa tta act aaa aaa aaa aaa aaa aaa gca gct att gca cys Ser Glu Lys Phe Thr Thr Lys Leu Lys Asp Asp Ser His Ala ggt ata caa agc gat gat ata caa aaa gca gct att gca aaa aaa gca gct att gca aaa aaa gca gct att gca gca gct att gca aaa aaa aaa gca gct att gca gca gct att aaa agc gaa gct tct caa aaa cta aaa aaa gca gct att gca gca gct att gca gca gca aaa aaa aaa gca gct att gca gca gct at aca aaa aaa gca gct att gca gca gct aaa aaa aaa gca gct att gca gca gct ata aaa aaa aaa aaa aaa aaa gca gct att gca gca gct ata aaa aaa gca gct att gca gca gct ata gca gca gct ata gca gca gct aaa aaa aaa gca gct att gca gca gct ata gca gca gct aaa aaa aaa gca gct att gca gca gct | Ctt ggc aaa cag gat gct acc gat gat cat gca aaa gca gct att Leu Gly Lys Gln Asp Ala Thr Asp Asp His Ala Lys Ala Ala Ile 130 aaa aca cat gca act acc gat aaa ggt gct aca gaa gaa ttt aaa gat Lys Thr His Ala Thr Thr Asp Lys Gly Ala Lys Glu Phe Lys Asp 160 ttt gaa tca gta gaa ggt ttg tta aaa gc gct caa gta gca cta Phe Glu Ser Val Lys Glu Leu Lys Ala Ala Gln Val Ala Leu 170 aat tca gtt aaa gaa ctt aca agt cct gtt gta gca gaa agt cca Asn Ser Val Lys Glu Leu Thr Ser Pro Val Val Ala Glu Ser Pro 180 aaa cct cat atg gct aaa aat tca ggt ggg ggg gat tct gca tat Lys Pro His Met Ala Asn Asn Ser Gly Gly Asp Ser Ala Ser Thr 195 cct gat gag tct gca aaa gaa cct aat ctt acc gta gac gaa agt cca Pro Asp Glu Ser Ala Lys Glv Pro Asn Leu Thr Val Ile Ser Lys 210 att aca gat tct acc act acc gca ttt ta cat gca ttt ta cat gca gct ggg aaa ggt ggg gat tct gca caa let gca ttt ta cct gca tat gac gaa gat gac gaa acc gaa gat gac gca acc gat gag tct gca aaa gaa gtt gac gca gaa gct gac gca acc gat gac gca gac gct caat ctt acc gat gac gca gac gct gac acc gac gac gac gac gct gac gac gac gct gac gac gac gct let gca acc gac gac gct gac gac gct gac gac gct let gca acc gac gac gct gac gac gct gac gac gct gac gac gct let gca gca gct gac gca gac gct gac gca gac gct gac gca gac gct gac gca gca gct gac gca gca gct gac gca gca gca gca gca gca gca gca gca |

| | | | | | | | | | 63/1 | .02 | | | | | | |
|------------------------------|-------------------|-------------------|-------------------|------------|------------|---------------------------|-------------------|-------------------|------------|-------------|-------------------|-------------------|-------------------|--------------|------------|------|
| aaa Lys | aca Thr | Nis | gga Gly 340 | act Thr | aaa Lys | gac Asp | aag Lys | ggt Gly 345 | gct Ala | aaa Lys | gaa Glu | ctt Leu | gaa Glu 350 | gag Glu | tta Leu | 1056 |
| ttt Phe | aaa Lys | tca Ser 355 | cta Leu | gaa Glu | agc Ser | ttg Leu | tca Ser 360 | aaa Lys | gca Ala | gcg Ala | caa Gln | gca Ala 365 | gca Ala | tta Leu | act Thr | 1104 |
| aat Asn | tca Ser 370 | gtt Val | aaa Lys | gag Glu | ctt Leu | aca Thr 375 | aat Asn | cct Pro | gtt Val | gtg Val | gca Ala 380 | gaa Glu | agt Ser | cca Pro | aaa Lys | 1152 |
| aaa Lys 385 | | taa * | · | | | | | | | | | | | | | 1161 |
| <210 <211 <212 <213 | > 38 > PF | 6 | Chime | era | | | | | | | | | | | | |
| Met | > 58 Cys | Ser | Asn | Ser | Gly | Lys | Gly | Gly | Asp 10 | Ser | Ala | Ser | Thr | Asn 15 | Pro | |
| 1 Ala | Asp | Glu | Ser 20 | Ala | Lys | $\phi_{\Gamma^{\Lambda}}$ | Pro | Asn 25 | Leu | Thr | Glu | Ile | Ser 30 | Lys | Lys | |
| Ile | Thr | | Ser | Asn | Ala | Phe | Val 40 | Leu | Ala | Val | Lys | Glu 45 | Val | Glu | Thr | |
| Leu | Val 50 | 35 Leu | Ser | Ile | Asp | Glu 55 | Leu | Ala | Lys | Lys | Ala 60 | Ile | Gly | Gln | Lys | |
| | Asp | Asn | Asn | Asn | Gly 70 | Leu | Alla | Ala | Leu | Asn 75 | Asn | Gln | Asn | Gly | Ser 80 | |
| 65 Leu | Leu | Ala | Gly | Ala 85 | Tyr | Ala | 119 | \Ser | Thr 90 | Leu | Ile | Thr | Glu | Lys 95 | Leu | |
| Ser | Lys | Leu | Lys 100 | Asn | Leu | Glu | Glu | Leu 105 | Lys | Thr | Glu | Ile | Ala 110 | Lys | Ala | |
| Lys | Lys | Cys 115 | Ser | Glu | Glu | Phe | Thr 120 | Asn | Lys | Leu | Lys | Ser 125 | Gly | His | Ala | |
| | 120 | Gly | | | | 135 | Thr | Asp | 1 | | 140 | | | | Ile | |
| Leu | Lys | Thr | His | Ala | Thr 150 | Thr | Asp | Lys | Gly | Ala 155 | Lys | Glu | Phe | Lys | Asp 160 | |
| 145 Leu | Phe | Glu | Ser | Val 165 | Glu | Gly | Leu | Leu | Lys 170 | Ala | a Ala | Gln | Val | Ala 175 | Leu | |
| Thr | Asn | Ser | Val 180 | Lys | Glu | Leu | Thr | Ser 185 | Pro | \Val | Val | Ala | Glu 190 | Ser | Pro | |
| Lys | Lys | Pro 195 | His | Met | Ala | Asn | Asr 200 | Ser | Gly | , 617 | / Asp | Ser 205 | Ala | Ser | Thr | |
| Asn | Pro 210 | Asp | Glu | ser Ser | Ala | Lys 215 | Gly | / Pro | Asn | ı Le | Thr 220 | Val | . Ile | e Ser | Lys | |
| Lys 225 | Ile | Thr | Asp | Ser | 230 | ı Ala | Phe | e Leu | Leu | a Ala 23 | a\Val | . Lys | Glu | ı Val | Glu 240 | |
| Ala | Leu | Leu | Ser | Ser 245 | Ile | Asp | Glu | ı Let | Ser 250 | Ly: | s À lā | ı Ile | e Gly | / Lys 255 | Lys | |
| Ile | Lys | Asn | Asp 260 | Gly | Th: | Leu | ı Ası | Asr 265 | ı Glı | | a Ash | n Arg | 3 Asr 270 | n Glu) | ı Ser | |
| Leu | Ile | Ala 275 | Gly | y Ala | а Туз | Glu | 1 Ile 280 | e Sei | Lys | s Le | u Ile | Thi 285 | Glr | ı Lys | s Leu | |

| 1 | | 1 | | | | | | | | 04/1 | .02 | | | | | | |
|---|------------------|----------------------------------|------------------|-----------------------|--------------------|------------------|------------------|-----------------------|-------------------|------------------|------------------|------------------|-----------------------|---------------------|------------------|------------------|-----|
| | | 200 | 1 | | Ser | | 295 | | | | | 300 | | | | | |
| | Asp | Cys | Ser | Gln | Lys | Phe | Thr | Thr | Lys | Leu | Lys | Asp | Ser | His | Ala | Glu 320 | |
| | 205 | | ١. | | Ser | 310 | | | | | 212 | | | | | 520 | |
| | Lys | Thr | His | Gly | 325 Thr | Lys | Asp | Lys | Gly 345 | Ala | Lys | Glu | Leu | Glu 350 | Glu | Leu | |
| | | | 355 | Leu | Glu | | | 360 | Lys | | | | 303 | | | | |
| | Asn | Ser 370 | Val | Ly | Glu | Leu | Thr 375 | Asn | Pro | Val | Val | Ala 380 | Glu | Ser | Pro | Lys | |
| | Lys 385 | Pro | | | | | | | *, | | | | | | | | |
| | <21 <21 | 0> 59 1> 11 2> Di 3> os | 197 NA | Chim | era | \ | | | | | | | | | | | |
| | | 0> 1> CI 2> (1 | | . (11 | 97) | | \ | | | | | | | | | | |
| | | 0> 5 aga Arg | ++- | tta Leu | ata Ile 5 | gga Gly | ttt Phe | gct Ala | tta Leu | gcg Ala 10 | ьeu | gct Ala | tta Leu | ata Ile | gga Gly 15 | tgt Cys | 48 |
| | gca Ala | caa Gln | aaa Lys | ggt Gly 20 | gct Ala | gag Glu | tca Ser | att Ile | gga Gly 25 | Ser | tgt Cys | aat Asn | aat Asn | tca Ser 30 | Сту | aaa Lys | 96 |
| | gat Asp | ggg Gly | aat Asn 35 | Thr | tct Ser | gca Ala | aat Asn | tct Ser 40 | / A⊥a | gat Asp | gag Glu | tct Ser | gtt Val 45 | . БУЗ | ggg Gly | cct Pro | 144 |
| | aat Asn | ctt Leu 50 | Thr | gaa Glu | ata Ile | agt Ser | aaa Lys 55 | Lys | att Ile | aco Thr | gat Asp | tct Ser 60 | ASI | gcg Ala | gtt Val | tta Leu | 192 |
| | ctt Lev 65 | ı Ala | gto Val | g aaa L Lys | ı gag s Glu | gtt Val 70 | . Glu | gcg Ala | ttg Lev | cto Lei | tca Ser 75 | . 561 | ata Ile | gat Asp | gaa Glu | att Ile 80 | 240 |
| ı | gct Ala | gct Ala | aaa Lys | a gct s Alá | att a Ile 85 | GT? | aaa Lys | aaa Lys | ata Ile | a cad His | i Agri | a aat n Asr | aat Asr | ggt Gly | tto Leu 95 | gat Asp | 288 |
| | aco Thi | c gaa r Glu | tai Ty: | t aat r Ası 100 | n His | : aat : Asr | gga Gly | a tca 7 Sei | tto Lei 10! | і Геі | a gde 1 Ala | Gl | a gct y Ala | tat a Tyr 110 | CALC | a ata a Ile | 336 |
| 1 | tca Se: | a aco | c ct Le | u Il | a aaa e Lys | caa Gli | a aaa n Lys | a tta s Lei 120 | ı Ası | t gg o Gl | a tto y Lei | g alaa u Ly | a aat s Asi 125 | II GI | a gga u Gly | a tta y Leu | 384 |

| ' | \ | | | | | | | | | 65/1 | 02 | | | | | | |
|------------------|----------------|-------------------|--------------------|--------------------|---------------------|----------------------|-------------------|--------------------|---------------------|----------------------|----------------------|-----------------------|--------------------|-------------------|-----------------------|-----------------------|------|
| aaq Lys | s G | aa Lu 30 | aaa Lys | att Ile | gat Asp | gcg Ala | gct Ala 135 | aag Lys | aaa Lys | tgt Cys | tct Ser | gaa Glu 140 | aca Thr | ttt Phe | act Thr | aat Asn | 432 |
| aaa Ly: 14 | s L | ta eu | aaa Lys | gaa Glu | aaa Lys | cac His 150 | aca Thr | gat Asp | ctt Leu | ggt Gly | aaa Lys 155 | gaa Glu | ggt Gly | gtt Val | act Thr | gat Asp 160 | 480 |
| gc Al | t g a A | at .sp | gca Ala | aaa Lys | gaa Glu 165 | gcc Ala | att Ile | tta Leu | aaa Lys | aca Thr 170 | aat Asn | ggt Gly | act Thr | aaa Lys | act Thr 175 | aaa Lys | 528 |
| gg Gl | t g y A | ct | gaa Glu | gaa Glu 180 | ctt Leu | gga Gly | aaa Lys | tta Leu | ttt Phe 185 | gaa Glu | tca Ser | gta Val | gag Glu | gtc Val 190 | ttg Leu | tca Ser | 576 |
| aa Ly | a g s A | ca la | gct Ala 195 | Lys | gag Glu | atg Met | ctt Leu | gct Ala 200 | aat Asn | tca Ser | gtt Val | aaa Lys | gag Glu 205 | ctt Leu | aca Thr | agc Ser | 624 |
| cc Pr | 0 / | gtt Val 210 | gtg Val | gca Ala | gaa Glu | agt Ser | cca Pro 215 | gcc Ala | atg Met | gta Val | aat Asn | aat Asn 220 | tca Ser | ggg | aaa Lys | gat Asp | 672 |
| gg G1 22 | y P | aat Asn | aca Thr | tct Ser | gca Ala | aat Asn 230 | Şer | gct Ala | gat Asp | gag Glu | tct Ser 235 | vaı | aaa Lys | ggg | cct Pro | aat Asn 240 | 720 |
| ct Le | t a | aca Thr | gaa Glu | ata Ile | agt Ser 245 | ₋ Lys | aaa Lys | att | aca Thr | gaa Glu 250 | Ser | aac Asn | gca Ala | gtt Val | gtt Val 255 | | 768 |
| go Al | cc (la ' | gtg Val | aaa Lys | gaa Glu 260 | ı gtt ı Val | gaa Glu | act Thr | ttq Leu | ctt Leu 265 | Thr | tct Ser | ata Ile | gat Asp | gag Glu 270 | псч | gct Ala | 816 |
| aa Ly | aa y | gct Ala | att Ile 275 | e Gly | aaa Y Lys | a aaa s Lys | ata Ile | aaa Lys 280 | ASI | gat Asp | gtt Val | agt Sei | tta Leu 285 | 1106 | aat Asn | gag Glu | 864 |
| g A | la | gat Asp 290 | His | c aad s Asi | c gga n Gly | a tca y Sei | tta Leu 295 | ITTE | tca Ser | gga Gl | a gca Ala | a tat a Tyi 300 | | att Ile | tca Ser | aac Asn | 912 |
| L | ta eu 05 | ata Ile | aca Th | a aa r Ly | a aaa s Ly: | a ata s Ile 31 | e Ser | gca Ala | a ata | a aaa e Lys | a gat s Asy 31 | DSE. | a gga r Gly | a gaa / Glu | a tto 1 Lei | g aag 1 Lys 320 | 960 |
| g A | ca la | gaa Glu | at 1 Il | t ga e Gl | a aa u Ly: 32 | s Al | t aaq a Lys | g aaa s Lys | a tgi s Cys | t tct s Se: 33 | L GI | a ga u Gl | a tti u Pho | t act | t gct r Ala 33! | t aaa a Lys 5 | 1008 |
| t | ta eu | aaa Lys | a gg s Gl | t ga y Gl 34 | u Hi | c ac s Th | a gat r Asj | t cti o Lei | t gg u G1; 34 | Āπλ | a ga s Gl | a gg u Gl | c\gt y \a | t act | 110 | t gat p Asp | 1056 |
| a | at | gca Ala | a aa a Ly 35 | s Ly | a gc s Al | c at a Il | t tt: e Le | a aa u Ly 36 | s In | a aa r As | t aa n As | t ga n As | t aa p Ly 36 | 5 ¼··· | t aa r Ly | g ggc s Gly | 1104 |

Sulver

Sulph'

| | | | \ | | | | | | | | | | | | | |
|----------------------------------|-----------------------|------------|------------|------------|-------------------|-------------------|------------|------------|-------------|-------------------|-------------------|------------|------------|-------------------|------------|------|
| gct g Ala A | gat (Asp (370 | gaa Glu | ctt Leu | gaa Glu | Lys | tta Leu 375 | ttt Phe | gaa Glu | tca Ser | gta Val | aaa Lys 380 | aac Asn | ttg Leu | tca Ser | aaa Lys | 1152 |
| gca 9 Ala A 385 | gct Ala | aaa Lys | gag Glu | atg Met | ctt Leu 390 | act Thr | aat Asn | tca Ser | gtt Val | aaa Lys 395 | gag Glu | ctt Leu | aca Thr | agc Ser | | 1197 |
| <210: <211: <212: <213: | > 39 > PR | 8 .T | Chime | era | | \ | | | | | | | | | | |
| <400 Arg | > 60 Leu | Leu | Ile | | Phe | Ala | Leu | Ala | Leu 10 | Ala | Leu | Ile | Gly | Cys 15 | Ala | |
| l Gln | Lys | Gly | | Glu | Ser | Ile | Gly | Ser 25 | | Asn | Asn | Ser | Gly 30 | Lys | Asp | |
| Gly | Asn | | 20 Ser | Ala | Asn | Ser | Ala | Asp | Glu | Ser | Val | Lys 45 | | Pro | Asn | |
| | E 0 | | | | | ካካ | ١. | | | | 00 | | | Leu | | |
| Ala | | | | | 70 | Ala | | 1 | | 15 | | | | Ile | ~ ~ | |
| | | | | 25 | Lys | | | ١ | 90 | | | | | Asp 95 | | |
| | | | 100 | Asn | | | | TOP | | | | | 110 | | | |
| | | 116 | Lys | | | | - 120 | | ` | | | 123 | | Leu | | |
| | 120 | Ile | | | | 1 1 7 | | | | | 770 | | | Asn | | |
| 1/5 | Lys | | | | 150 | | | | ١. | TOO | 1 | | | Asp | | |
| Asp | | | | 165 | | | | | 1 / () | • | | | | 1 / U | | |
| | | | 1 🛭 | Gly | Lys | | | 182 | | · \ | | | 100 | , | Lys | |
| | | 105 | Glu | Met | | | 200 | | | | \ | 200 | | Ser | | |
| | 210 | Ala | Glu | | | 215 | | | | | X.Z.U | | | | Gly | |
| 225 | Thr | Ser | | | - 230 | | | | | 230 | , , | | | | Leu 240 | |
| Thr | | | | 245 | · | | | | 250 | , | | 1 | | 250 | | |
| | | | 260 | ١ | | | | 265 |) | | | 1 | 2/(| , | Lys | |
| | | 275 | Lys | : Lys | | | 280 |) | | | | 201 | , | | ı Ala | |
| | 200 | Asr | ı Gly | | Leu | 795 |) | | | | 500 | , | 1 | | l Leu | |
| 205 | Thr | Lys | | | 310 | } | | | | 21: | 2 | | • | | 320 | |
| Glu | Ile | Glu | ı Lys | 32! | a Lys 5 | s Lys | s Cys | s Se | r Gli 33 | u Gli 0 | u Phe | e Thi | C AL | а Lys 33! \ | s Leu | L |
| | | | | | | | | | | | | | | \ | | |

Lys Gly Glu Hi Thr Asp Leu Gly Lys Glu Gly Val Thr Asp Asp Asn 345 Ala Lys Lys Ala le Leu Lys Thr Asn Asn Asp Lys Thr Lys Gly Ala 360 Asp Glu Leu Glu Lys Leu Phe Glu Ser Val Lys Asn Leu Ser Lys Ala 380 375 Ala Lys Glu Met Let Thr Asn Ser Val Lys Glu Leu Thr Ser 390 <210> 61 <211> 1196 <212> DNA <213> ospC Chimera <220> <221> CDS <222> (1)...(1196) atg aga tta tta ata gga ttt gct tta gcg tta gct tta ata gga tgt Met Arg Leu Ile Gly Phe Ala Leu Ala Leu Ile Gly Cys gca caa aaa ggt gct gag tca att gga tcc tgt aat aat tca ggg aaa Ala Gln Lys Gly Ala Glu Ser Ile Gly Ser Cys Asn Asn Ser Gly Lys gat ggg aat aca tot gca aat tot gct gat gag tot gtt aaa ggg oot 144 Ásp Glý Asn Thr Ser Ála Asn Ser Ála Ásp Glú Ser Val Lys Glý Pro 40 aat ctt aca gaa ata agt aaa aaa att\acg gat tct aat gcg gtt tta 192 Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Asp Ser Asn Ala Val Leu ctt gct gtg aaa gag gtt gaa gcg ttg ct q tca tct ata gat gaa att Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu Ile gct gct aaa gct att ggt aaa aaa ata cac caa aat aat ggt ttg gat 288 Ála Ála Lys Ála Ile Gly Lys Lys Ile His Gla Asn Asn Gly Leu Ásp acc gaa tat aat cac aat gga tca ttg tta gcg (ga gct tat gca ata 336 Thr Glu Tyr Asn His Asn Gly Ser Leu Leu Ala Gy Ala Tyr Ala Ile 100 tca acc cta ata aaa caa aaa tta gat gga ttg aaa \aat gaa gga tta 384 Ser Thr Leu Ile Lys Gln Lys Leu Asp Gly Leu Lys Asn Glu Gly Leu 120 115 aag gaa aaa att gat gcg gct aag aaa tgt tct gaa aca ttt act aat Lys Glu Lys Ile Asp Ala Ala Lys Lys Cys Ser Glu Thr Phe Thr Asn 432 130 aaa tta aaa gaa aaa cac aca gat ctt ggt aaa gaa ggt gt act gat 480 Lys Leu Lys Glu Lys His Thr Asp Leu Gly Lys Glu Gly Val Thr Asp 150 145

| / | | \ | | | | | | | | | | | | | | |
|------------|------------------------|----------------------|-------------------|-------------------|--------------|--------------------|--------------|-------------------|-------------------|----------------|----------------------|------------|-------------------|-------------------|---------------------|------|
| gct Ala | gat Asp | gca Ala | aaa Lys | gaa Glu 165 | gcc Ala | att Ile | tta Leu | aaa Lys | aca Thr 170 | aat Asn | ggt Gly | act Thr | aaa Lys | act Thr 175 | aaa Lys | 528 |
| ggt Gly | gct Ala | gaa Glu | gaa Glu 180 | ctt Leu | gga Gly | aaa Lys | tta Leu | ttt Phe 185 | gaa Glu | tca Ser | gta Val | gag Glu | gtc Val 190 | ttg Leu | tca Ser | 576 |
| Lys | Ala | Ala 195 | Lys | gag Glu | Met | ьeu | 200 | ASII | 261 | Val | Дуо | 205 | | | | 624 |
| Pro | Val 210 | Val | Ala | gaa Glu | Ser | 215 | AIG | nec | var | | 220 | | - | _ | | 672 |
| Gly 225 | Asn | Thr | Ser | gca Ala | 230 | Ser | Ala | ASP | GIU | 235 | • • • • | | 3 | | 240 | 720 |
| Leu | Thr | Glu | ı Ile | agt Ser 245 | Lys | γу | 11e | 1111 | 250 | Jer | 71511 | | | 255 | | 768 |
| Ala | Val | . Lys | 260 260 | | Glu | Thr | Ten | 265 |) | . Der | . 110 | | 270 |) | | 816 |
| Thr | : Lys | 3 Ala 275 | a Ile 5 | e Gly | гLуs | гÀг | 280 | , G11 | 1 911 | , ASI | | 285 | 5 | | | 864 |
| Glu | 1 Ala 29 | a Gl: O | y His | s Asn | ı GIŞ | 295 | . тес | те. | , AL | 1 01, | 300 | 5 | | | tca Ser | 912 |
| Ly: 30! | s Le [.] 5 | u Il | e Th | r Glr | 1 Lys 310 |) Let | ı AS | o GI | λ /re | 31 | 5 | 50 | | , | tta Leu 320 | 960 |
| Ly | s Gl | u Ly | s Il | e GI1 | ı Ası 5 | n Ale | а гу | г гу | 33 | 0/ | 1 01 | u | P | 33 | t aaa r Lys 5 | 1008 |
| Lу | s Le | u Gl | u G1. 34 | y GI | u Hl | S AI | a GI | 34 | 5 | y 11 | \ | | 35 | 0 | t gat r Asp | 1056 |
| Gl | u As | n Al 35 | .a Ly 55 | s Ly | s Al | a II | е <u>г</u> е | iu 11 | .e 11. | II No | , | 36 | 55 | | t aag p Lys | 1104 |
| gg Gl | y Al | et go La Al 70 | ca ga la Gl | ag ct Lu Le | t ga u Gl | a aa u Ly 37 | S Te | a tt eu Ph | t aa ne Ly | na go /s Al | ca gt La Va 38 | -/ | ia aa .u As | ic tt sn Le | g gca u Ala | 1152 |
| | | | | | | | | | | | | / | \ | | | |

CulpA1

69/102

aaa gca gct aaa gag atg ctt gct aat tca gtt aaa gag ctt ac Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val Lys Glu Leu 385 390 395

1196

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SultAl

| | | \ | | | | | | | | . •, === | | | | | | | |
|---|---|--------------------|-------------------|-------------------|-------------------|------------------|-------------------|-------------------|-------------------|-----------------------|------------------|-------------------|-------------------|-------------------|---------------------|-------------------|-----|
| 1 | | Ala 370 | Glu | Leu | gtra | Lys | Leu 375 | Phe | Lys | Ala | Val | Glu 380 | Asn | Leu | Ala | Lys | |
| | Ala 2 385 | Ala | Lys | Glu | Met | Leu 390 | | Asn | Ser | Val | Lys 395 | Glu | Leu | | | | |
| • | <210> 63 <211> 1185 <212> DNA <213> ospC Chimera | | | | | | | | | | | | | | | | |
| | | > CD | | (118 | 35) | ' | | | | | | | | | | | |
| | 2 ± 6 | > 63 aga Arg | t t a | tta Leu | ata Ile 5 | gga Gly | ttt Phe | gct Ala | tta Leu | gcg Ala 10 | tta Leu | gct Ala | tta Leu | ata Ile | gga Gly 15 | tgt Cys | 48 |
| | gca Ala | caa Gln | aaa Lys | ggt Gly 20 | gct Ala | gag Glu | tca Ser | att Ile | gga Gly 25 | tcc Ser | tgt Cys | aat Asn | aat Asn | tca Ser 30 | ggg Gly | aaa Lys | 96 |
| | gat Asp | ggg Gly | aat Asn 35 | aca Thr | tct Ser | gca Ala | aat Asn | tct Ser 40 | gct Ala | gat Asp | gag Glu | tct Ser | gtt Val 45 | aaa Lys | ggg Gly | cct Pro | 144 |
| | aat Asn | ctt Leu 50 | aca Thr | gaa Glu | ata Ile | agt Ser | aaa Lys 55 | aaa Lys | att | acg Thr | gat Asp | tct Ser 60 | Asn | gcg Ala | gtt Val | tta Leu | 192 |
| | ctt Leu 65 | gct Ala | gtg Val | aaa Lys | gag Glu | gtt Val 70 | gaa Glu | gcg Ala | ttg Leu | ctg | tca Ser 75 | Ser | ata Ile | gat Asp | gag Glu | ctt Leu 80 | 240 |
| | gct Ala | aaa Lys | gct Ala | att Ile | ggt Gly 85 | aaa Lys | aaa Lys | ata Ile | aaa Lys | aac Asn 90 | Asp. | ggt Gly | agt Ser | tta Leu | gat Asp 95 | aat Asn | 288 |
| | gaa Glu | gca Ala | aat Asn | cgc Arg 100 | Asn | gag Glu | tca Ser | ttg Leu | tta Leu 105 | . Ala | gga Gly | gct | tat Tyr | aca Thr 110 | тте | tca Ser | 336 |
| | acc Thr | tta Leu | ata Ile 115 | Thr | caa Gln | aaa Lys | tta Leu | agt Ser 120 | Lys | tta Leu | aac Asn | : gga : GLy | tca Ser 125 | GIU | ggt Gly | tta Leu | 384 |
| | aag Lys | gaa Glu 130 | Lys | att Ile | gcc Ala | gca Ala | gct Ala 135 | Lys | aaa Lys | tgc Cys | tct Ser | gaa Glu 140 | I/GTO | ttt Phe | agt Ser | act Thr | 432 |
| | aaa Lys 145 | cta Leu | aaa Lys | gat Asp | aat Asn | cat His | Ala | cag Gln | ctt Leu | ggt Gly | ata 116 | Glr | r GT/A | gtt Val | act Thr | gat Asp 160 | 480 |
| | gaa Glu | aat Asn | gca Ala | aaa Lys | aaa Lys 165 | Ala | att Ile | tta Leu | aaa Lys | a gca s Ala 170 | Asr | gca n Ala | a gcg a Ala | y Gly | aaa 7 Lys 175 | gat Asp | 528 |
| | | | | | | | | | | | | | | \ | | | |

| aag Lys | ggc Gly | gtt Val | gaa Glu 180 | gaa Glu | ctt Leu | gaa Glu | aag Lys | ttg Leu 185 | tcc Ser | gga Gly | tca Ser | tta Leu | gaa Glu 190 | agc Ser | tta Leu | 576 |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| tca Ser | aaa Lys | gca Ala 195 | gct Ala | aaa Lys | GJ/n gag | atg Met | ctt Leu 200 | gct Ala | aat Asn | tca Ser | gtt Val | aaa Lys 205 | gag Glu | ctt Leu | aca Thr | 624 |
| agc Ser | cct Pro 210 | gtt Val | gtc Val | cat His | ggt Gly | aat Asn 215 | aat Asn | tca Ser | ggg Gly | aaa Lys | gat Asp 220 | ggg Gly | aat Asn | aca Thr | tct Ser | 672 |
| gca Ala 225 | aat Asn | tct Ser | gct Ala | gat Asp | gag Glu 230 | tct Ser | gtt Val | aaa Lys | ggg Gly | cct Pro 235 | aat Asn | ctt Leu | aca Thr | gaa Glu | ata Ile 240 | 720 |
| agt Ser | aaa Lys | aaa Lys | att Ile | aca Thr 245 | gaa Glu | tct Ser | aac Asi | gca Ala | gtt Val 250 | gtt Val | ctc Leu | gcc Ala | gtg Val | aaa Lys 255 | gaa Glu | 768 |
| gtt Val | gaa Glu | act Thr | ttg Leu 260 | ctt Leu | aca Thr | tct Ser | ata Ile | gat Asp 265 | gag Glu | ctt Leu | gct Ala | aaa Lys | gct Ala 270 | att Ile | ggt Gly | 816 |
| aaa Lys | aaa Lys | ata Ile 275 | aaa Lys | aac Asn | gat Asp | gtt Val | agt Ser 280 | tta Leu | gat Asp | aat Asn | gag Glu | gca Ala 285 | gat Asp | cac His | aac Asn | 864 |
| gga Gly | tca Ser 290 | tta Leu | ata Ile | tca Ser | gga Gly | gca Ala 295 | tat Tyr | tta Leu | att Ile | tca Ser | aac Asn 300 | tta Leu | ata Ile | aca Thr | aaa Lys | 912 |
| aaa Lys 305 | ata Ile | agt Ser | gca Ala | ata Ile | aaa Lys 310 | gat Asp | tca Ser | gga Gly | gaa Glu | ttg Leu 315 | aag Lys | gca Ala | gaa Glu | att Ile | gaa Glu 320 | 960 |
| aag Lys | gct Ala | aag Lys | aaa Lys | tgt Cys 325 | Ser | gaa Glu | gaa Glu | ttt Phe | act Thr 330 | Ala | aaa Lys | tta Leu | aaa Lys | ggt Gly 335 | gaa Glu | 1008 |
| cac His | aca Thr | gat Asp | ctt Leu 340 | Gly | aaa Lys | gaa Glu | ggc Gly | gtt Val 345 | Thr | gat Asp | gat Asp | aat Asn | gca Ala 350 | груѕ | aaa Lys | 1056 |
| gcc Ala | att Ile | tta Leu 355 | Lys | aca Thr | aat Asr | aat Asn | gat Asp 360 | ь гуs | act Thr | aag Lys | ggc Gly | gct Ala 365 | ASL | gaa Glu | ctt Leu | 1104 |
| gaa Glu | aag Lys | Let | ttt Phe | gaa Glu | tca Sei | gta Val | . Lys | aac Asn | ttg Lev | tca Ser | aaa Lys 380 | AT4 | gct Ala | aaa Lys | gag Glu | 1152 |
| atg Met 385 | Let | act Thr | aat Asr | tca Ser | gtt Val | aaa L Lys | ı gaç Glu | g ctt 1 Leu | aca Thr | ago Ser 395 | - | | | | | 1185 |
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<211> 1184

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Ξ

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<\212> DNA <213> ospC Chimera <220> <221入 CDS <222>\(1)...(1184) <400> 65\ atg aga ta tta ata gga ttt gct tta gcg tta gct tta ata gga tgt 48 Met Arg Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys 10 gca caa aaa ggt gct gag tca att gga tcc tgt aat aat tca ggg aaa 96 Ála Gln Lys Gly Ála Glú Ser Ile Gly Ser Cys Asn Asn Ser Gly Lys gat ggg aat aca tct gca aat tct gct gat gag tct gtt aaa ggg cct 144 Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro 40 aat ctt aca gaa ata agt aaa aaa att acg gat tct aat gcg gtt tta 192 Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Asp Ser Asn Ala Val Leu 55 50 ctt gct gtg aaa gag gtt qaa gcg ttg ctg tca tct ata gat gag ctt 240 Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu Leu 70 65 288 gct aaa gct att ggt aaa aaa 🕽 ta aaa aac gat ggt agt tta gat aat Ala Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp Gly Ser Leu Asp Asn 90 85 gaa gca aat cgc aac gag tca ttg igstarta gca gga gct tat aca ata tca 336 Glu Ála Asn Arg Asn Glú Ser Leú Leu Ála Gly Ála Tyr Thr Ile Ser 100 acc tta ata aca caa aaa tta agt aaa tta agt ta aac gga tca gaa ggt tta 384 Thr Leu Ile Thr Gln Lys Leu Ser Lys Leu Asn Gly Ser Glu Gly Leu 120 115 aag gaa aag att gcc gca gct aag aaa tgc tct gaa gag ttt agt act 432 Lys Glu Lys Ile Ala Ala Ala Lys Lys Cys Ser Glu Glu Phe Ser Thr 130 aaa cta aaa gat aat cat gca cag ctt ggt ata cag ggc gtt act gat Lys Leu Lys Asp Asn His Ala Gln Leu Gly Ile Gln Gly Val Thr Asp 480 150 145 gaa aat gca aaa aaa gct att tta aaa gca aat gca \qcg ggt aaa gat 528 Glu Asn Ála Lys Lys Ála Ile Leu Lys Ála Asn Ála Ála Gly Lys Ásp aag ggc gtt gaa gaa ctt gaa aag ttg tcc gga tca tta gaa agc tta 576 Lys Gly Val Glu Glu Leu Glu Lys Leu Ser Gly Ser Leu Glu Ser Leu 180 tca aaa gca gct aaa gag atg ctt gct aat tca gtt aaa gag ctt aca 624 Ser Lys Ála Ála Lys Glú Met Leu Ála Asn Ser Val Lys Glú Deu Thr 200

| , | | | | | | | | | | | | | | | | | |
|---|-------------------|----------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| | | cct Pro 210 | | | | | | | | | | | | | | | 672 |
| | gca Ala 225 | aat Asn | tct Ser | gct Ala | gat Asp | gag Glu 230 | tct Ser | gtt Val | aaa Lys | ggg Gly | cct Pro 235 | aat Asn | ctt Leu | aca Thr | gaa Glu | ata Ile 240 | 720 |
| | | aaa Lys | | | | | | | | | | | | | | | 768 |
| | att Ile | gaa Glu | act Thr | ttg Leu 260 | ctt Leu | gca Ala | tct Ser | ata Ile | gat Asp 265 | gaa Glu | ctt Leu | gct Ala | act Thr | aaa Lys 270 | gct Ala | att Ile | 816 |
| | ggt Gly | aaa Lys | aaa Lys 275 | ata Ile | caa Gln | caa Gln | aat Asn | ggt Gly 280 | ggt Gly | tta Leu | gct Ala | gtc Val | gaa Glu 285 | gcg Ala | ggg Gly | cat His | 864 |
| | aat Asn | gga Gly 290 | aca Thr | ttg Leu | tta Leu | gca Ala | ggt Gly 295 | gct Ala | tat Tyr | aca Thr | ata Ile | tca Ser 300 | aaa Lys | cta Leu | ata Ile | aca Thr | 912 |
| | caa Gln 305 | aaa Lys | tta Leu | gat Asp | gga Gly | ttg Leu 310 | aaa Lys | aat\ Asn | tca Ser | gaa Glu | aaa Lys 315 | tta Leu | aag Lys | gaa Glu | aaa Lys | att Ile 320 | 960 |
| | gaa Glu | aat Asn | gct Ala | aag Lys | aaa Lys 325 | tgt Cys | tct Ser | gaa Glu | gat Asp | ttt Phe 330 | act Thr | aaa Lys | aaa Lys | cta Leu | gaa Glu 335 | gga Gly | 1008 |
| | gaa Glu | cat His | gcg Ala | caa Gln 340 | ctt Leu | gga Gly | att Ile | gaa Glu | aat Asn 345 | gtt Val | act Thr | gat Asp | gag Glu | aat Asn 350 | gca Ala | aaa Lys | 1056 |
| | | gct Ala | | | | | | | | | | | | | | | 1104 |
| | ctt Leu | gaa Glu 370 | aag Lys | cta Leu | ttt Phe | aaa Lys | gca Ala 375 | gta Val | gaa Glu | aac Asn | ttg Leu | gca Ala 380 | aaa Lys | gca Ala | gct Ala | aaa Lys | 1152 |
| | | atg Met | | | | | | | | | ac | \ | | | | | 1184 |
| | <212 <212 | 0> 66 1> 39 2> PI 3> os | 93 RT | Chime | era | | | | | | | | \ | | | | |
| | |)> 66 Leu | | Ile | Gly 5 | Phe | Ala | Leu | Ala | Leu 10 | Ala | Leu | Ile | Gly | Cys | Ala | |
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Leu Thr Glu \textsqle Ser Lys Lys Ile Thr Asp Ser Asn Ala Val Leu Leu
Ala Val Lys Ghu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu Leu Ala
                                         75
                    70
Lys Ala Ile Gly\Lys Lys Ile Lys Asn Asp Gly Ser Leu Asp Asn Glu
                                     90
                \85
Ala Asn Arg Asn Au Ser Leu Leu Ala Gly Ala Tyr Thr Ile Ser Thr
            100
Leu Ile Thr Gln Ly% Leu Ser Lys Leu Asn Gly Ser Glu Gly Leu Lys
                            120
                                                  125
        115
Glu Lys Ile Ala Ala Ala Lys Lys Cys Ser Glu Glu Phe Ser Thr Lys
                        135
                                             140
Leu Lys Asp Asn His A\(\frac{1}{4}\)a Gln Leu Gly Ile Gln Gly Val Thr Asp Glu
                                         155
                    150
Asn Ala Lys Lys Ala Ila Leu Lys Ala Asn Ala Ala Gly Lys Asp Lys
                                     170
                165
Gly Val Glu Glu Leu Glu Lys Leu Ser Gly Ser Leu Glu Ser Leu Ser
                                                      190
                                 185
            180
Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val Lys Glu Leu Thr Ser
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                            200
Pro Val Val His Gly Asn Asoldsymbol{\lambda} Ser Gly Lys Asp Gly Asn Thr Ser Ala
                        215
                                             220
Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser
                                         235
                    230
Lys Lys Ile Thr Glu Ser Asn A\(\frac{1}{4}\)a Val Leu Ala Val Lys Glu Ile
                                     250
                245
Glu Thr Leu Leu Ala Ser Ile Asp\Glu Leu Ala Thr Lys Ala Ile Gly
            260
                                 \265
Lys Lys Ile Gln Gln Asn Gly Gly 庵 eu Ala Val Glu Ala Gly His Asn
                                                  285
                             280
Gly Thr Leu Leu Ala Gly Ala Tyr Thm{r} Ile Ser Lys Leu Ile Thr Gln
                                              300
                         295
Lys Leu Asp Gly Leu Lys Asn Ser Glu\Lys Leu Lys Glu Lys Ile Glu
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                                          315
Asn Ala Lys Lys Cys Ser Glu Asp Phe Thr Lys Lys Leu Glu Gly Glu
                                     330
                325
His Ala Gln Leu Gly Ile Glu Asn Val Thr Asp Glu Asn Ala Lys Lys
                                 345
Ala Ile Leu Ile Thr Asp Ala Ala Lys Asp 1/4ys Gly Ala Ala Glu Leu
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Glu Lys Leu Phe Lys Ala Val Glu Asn Leu Ala Lys Ala Ala Lys Glu
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Met Leu Ala Asn Ser Val Lys Glu Leu
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|------------------------------------|-----------------------|---------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|-------------------|-------------------|-------------------|-------------------|-----|
| gca caa Ala Glr | aaa Lys | ggt Gly 20 | gct Ala | gag Glu | tca Ser | att Ile | gga Gly 25 | tcc Ser | tgt Cys | aat Asn | aat Asn | tca Ser 30 | ggg Gly | aaa Lys | 96 |
| gat ggg Asp Gly | aat Asn 35 | aca Thr | tct | gca Ala | aat Asn | tct Ser 40 | gct Ala | gat Asp | gag Glu | tct Ser | gtt Val 45 | aaa Lys | ggg Gly | cct Pro | 144 |
| aat ctt Asn Lei 50 | 1 Thr | gaa Glu | ata Ile | agt Ser | aaa Lys 55 | aaa Lys | att Ile | acg Thr | gat Asp | tct Ser 60 | aat Asn | gcg Ala | gtt Val | tta Leu | 192 |
| ctt gct Leu Ala 65 | gtg Val | aaa Lys | gag Glu | gtt Val 70 | gaa Glu | gcg Ala | ttg Leu | ctg Leu | tca Ser 75 | tct Ser | ata Ile | gat Asp | gag Glu | ctt Leu 80 | 240 |
| gct aaa Ala Lys | a gct s Ala | att Ile | ggt Gly 85 | aaa Lys | aaa Lys | ata Ile | aaa Lys | aac Asn 90 | gat Asp | ggt Gly | agt Ser | tta Leu | gat Asp 95 | aat Asn | 288 |
| gaa gca Glu Ala | a aat a Asn | cgc Arg 100 | aac Asn | gag Glu | tca Ser | ttg Leu | tta Leu 105 | gca Ala | gga Gly | gct Ala | tat Tyr | aca Thr 110 | ata Ile | tca Ser | 336 |
| acc tt Thr Le | a ata u Ile 115 | Thr | caa Gln | aaa Lys | tta Leu | agt Ser 120 | Lys | tta Leu | aac Asn | gga Gly | tca Ser 125 | gaa Glu | ggt Gly | tta Leu | 384 |
| aag ga Lys Gl 13 | u Lys | att Ile | gcc Ala | gca Ala | gct Ala 135 | aag Lys | aaa Lys | tgc Cys \ | tct Ser | gaa Glu 140 | GIU | ttt Phe | agt Ser | act Thr | 432 |
| aaa ct Lys Le 145 | a aaa u Lys | gat Asp | aat Asn | cat His 150 | Ala | cag Gln | ctt Leu | ggt Gly | ata Ile 155 | GIN | ggc Gly | gtt Val | act Thr | gat Asp 160 | 480 |
| gaa aa Glu As | t gca n Ala | aaa Lys | aaa Lys 165 | Ala | att Ile | tta Leu | aaa Lys | gca Ala 170 | ASD | gca Ala | gcg Ala | ggt Gly | aaa Lys 175 | ASP | 528 |
| aag gg Lys Gl | c gtt y Val | gaa L Glu 180 | ı Glu | ctt Leu | gaa Glu | aag Lys | ttg Leu 185 | Ser | gga Gly | tca Ser | tta Leu | gaa Glu 190 | Ser | tta Leu | 576 |
| tca aa Ser Ly | a gca s Ala 195 | a Ala | aaa Lys | gag Glu | ı atçı Met | ctt Leu 200 | ı Ala | aat Asr | tca Ser | gtt Val | aaa Lys 205 | i GIL | g ctt 1 Leu | aca Thr | 624 |
| agc co Ser Pi 21 | o Va | t gto l Vai | c cat l His | ggt Gly | aat Asr 215 | n Asr | tca Sei | a aga | a aaa g Lys | a gat s Asp 220 | o GT | y aat Asr | gca n Ala | a tct a Ser | 672 |

| , | 4 | | | ///10 |) | | | | |
|--|-----------------|--------------|---------------|-------|--------------|---------|--------|-----|------|
| aca aat tct Thr Asn Ser 225 | Ala Asp G | | | Gly F | | | | | 720 |
| agt aaa aaa Ser Lys Lys | | | | | | | | | 768 |
| gtt gag acc Val Glu Thr | | | | Glu I | | Thr L | | | 816 |
| ggt aag aaa Gly Lys Lys 275 | | sn Asn | | | | | | | 864 |
| aca tca ttg Thr Ser Leu 290 | | | | | | | | | 912 |
| aaa tta aat Lys Leu Asn 305 | Val Leu L | | | Leu L | | | | | 960 |
| gct aag caa Ala Lys Gln | | | | | | | | | 1008 |
| gca gtg ctt Ala Val Leu | | | | Asp A | | Ala G | | | 1056 |
| att tta aaa Ile Leu Lys 355 | | la Asn | | | | | | | 1104 |
| aag tta ttt Lys Leu Phe 370 | | | | | | | | | 1152 |
| tta aaa aat Leu Lys Asn 385 | Ala Val L | | | | C | | | | 1184 |
| <210> 68 <211> 393 <212> PRT <213> ospC (| Chimera | | | | | | | | |
| <400> 68 | 71 01 D | | | | , | <u></u> | | - 1 | |
| Arg Leu Leu 1 | 5 | | | 10 | | \ | 15 | | |
| Gln Lys Gly | Ala Glu S 20 | er Ile | Gly Ser 25 | Cys A | sn Asn | Selt GI | | Asp | |
| Gly Asn Thr 35 | Ser Ala A | | Ala Asp 40 | Glu S | er Val | Lys GI | ly Pro | Asn | |
| Leu Thr Glu 50 | Ile Ser L | ys Lys 55 | Ile Thr | Asp S | er Asn 60 | 1 | Leu | Leu | |

SultA

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Lys Ala Ile Cly Lys Lys Ile Lys Asn Asp Gly Ser Leu Asp Asn Glu
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Ala Asn Arg Ask Glu Ser Leu Leu Ala Gly Ala Tyr Thr Ile Ser Thr
                                105
            100\
Leu Ile Thr Gln Lys Leu Ser Lys Leu Asn Gly Ser Glu Gly Leu Lys
                            120
        115
Glu Lys Ile Ala Ala Lys Lys Cys Ser Glu Glu Phe Ser Thr Lys
                       135
    130
Leu Lys Asp Asn His Ala Gln Leu Gly Ile Gln Gly Val Thr Asp Glu
                    1\50
Asn Ala Lys Lys Ala I he Leu Lys Ala Asn Ala Ala Gly Lys Asp Lys
                                                        175
                                    170
                165
Gly Val Glu Glu Leu Glu\Lys Leu Ser Gly Ser Leu Glu Ser Leu Ser
                               185
            180
Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val Lys Glu Leu Thr Ser
                                                205
                           200
        195
Pro Val Val His Gly Asn Ash Ser Arg Lys Asp Gly Asn Ala Ser Thr
                                            220
                        215
Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser
                                        235
                    230
Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Val
                                    250
                245
Glu Thr Leu Leu Ala Ser Ile Asp\Glu Leu Ala Thr Lys Ala Ile Gly
                                265
Lys Lys Ile Gly Asn Asn Gly Leu Qu Ala Asn Gln Ser Lys Asn Thr
                                                 285
                            280
Ser Leu Leu Ser Gly Ala Tyr Ala Ile Ser Asp Leu Ile Ala Glu Lys
                                            300
                        295
Leu Asn Val Leu Lys Asn Glu Glu Leu Lys Glu Lys Ile Asp Thr Ala
                                        315
                    310
Lys Gln Cys Ser Thr Glu Phe Thr Asn Lxs Leu Lys Ser Glu His Ala
                                     330
                325
Val Leu Gly Leu Asp Asn Leu Thr Asp Asp\Asn Ala Gln Arg Ala Ile
                                 345
            340
Leu Lys Lys His Ala Asn Lys Asp Lys Gly Ala Ala Glu Leu Glu Lys
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Leu Phe Lys Ala Val Glu Asn Leu Ser Lys Ala Ala Gln Asp Thr Leu
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Lys Asn Ala Val Lys Glu Leu Thr Ser
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 atg aga tta tta ata gga ttt gct tta gcg tta gct tta ata gga tgt
 Met Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys
                                      10
```

48

Sub Al 1

| | | | \ | | | | | | | | | | | | | |
|---------------------|------------------|------------------|-------------------|------------------|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|------------------|-------------------|-------------------|------------------|-----|
| | | | | | | | | | | | | | | ggg Gly | | 96 |
| gat Asp | ggg Gly | aat Asn 35 | aca Thr | tct\ Ser | gca Ala | aat Asn | tct Ser 40 | gct Ala | gat Asp | gag Glu | tct Ser | gtt Val 45 | aaa Lys | ggg Gly | cct Pro | 144 |
| aat Asn | ctt Leu 50 | aca Thr | gaa Glu | ata Ile | agt Ser | aaa Lys 55 | aaa Lys | att Ile | acg Thr | gat Asp | tct Ser 60 | aat Asn | gcg Ala | gtt Val | tta Leu | 192 |
| ctt Leu 65 | gct Ala | gtg Val | aaa Lys | gag Glu | gtt Val 70 | gaa Glu | gcg Ala | ttg Leu | ctg Leu | tca Ser 75 | tct Ser | ata Ile | gat Asp | gag Glu | ctt Leu 80 | 240 |
| gct Ala | aaa Lys | gct Ala | att Ile | ggt Gly 85 | aaa Lys | aaa Lys | ata Ile | aaa Lys | aac Asn 90 | gat Asp | ggt Gly | agt Ser | tta Leu | gat Asp 95 | aat Asn | 288 |
| gaa Glu | gca Ala | aat Asn | cgc Arg 100 | aac Asn | gag Glu | tca Ser | ttg Leu | tta Leu 105 | gca Ala | gga Gly | gct Ala | tat Tyr | aca Thr 110 | ata Ile | tca Ser | 336 |
| | | | | | | | | | | | | | | ggt Gly | | 384 |
| | | | | | | | | | | | | | | agt Ser | | 432 |
| | | | | | | | | | | | | | | act Thr | | 480 |
| | | | | | | | | | | | | | | aaa Lys 175 | | 528 |
| a a g Lys | ggc Gly | gtt Val | gaa Glu 180 | gaa Glu | ctt Leu | gaa Glu | aag Lys | ttg Leu 185 | tcc Ser | gga Gly | tca Ser | tta Leu | gaa Glu 190 | agc Ser | tta Leu | 576 |
| | | | | | | | | | | | | | | ctt Leu | | 624 |
| | | | | | | | | | | | | | | tct Ser | | 672 |
| | | | | | | | | | | | | | | agc Ser | | 720 |
| | | | | | | gca Ala | | | | | | | | gtt Val 255 | gag Glu | 768 |

| l | | | | \ | | | | | | | | | | | | | |
|---|--------------|----------------------------------|-------------------|-------------------|------------|------------|------------|-------------------|-------------------|------------|------------|------------|-------------------|-------------------|-------------------|------------|------|
| | gct Ala | ttg Leu | ctt Leu | tca Ser 260 | tct Ser | ata Ile | gat Asp | gaa Glu | ctt Leu 265 | tct Ser | aaa Lys | gct Ala | att Ile | ggt Gly 270 | aaa Lys | aaa Lys | 816 |
| | ata Ile | aaa Lys | aat Asn 275 | gat Asp | ggt Gly | act Thr | tta Leu | gat Asp 280 | aac Asn | gaa Glu | gca Ala | aat Asn | cga Arg 285 | aac Asn | gaa Glu | tca Ser | 864 |
| | | | | | | | | | | | | | | | aaa Lys | | 912 |
| | | | | | | | | | | | | | | | gct Ala | | 960 |
| | | | | | | | | | | | | | | | gca Ala 335 | | 1008 |
| | | | | | | | | | | | | | | | att Ile | | 1056 |
| | | | | | | | | | | | | | | | gag Glu | | 1104 |
| | | | | | | | | | | | | | | | tta Leu | | 1152 |
| | | | | | | | | | | | | | | | cca Pro | | 1200 |
| | aaa Lys | cct Pro | taa * | | | | | | | | | | | | | | 1209 |
| | <211 <212 |)> 7(l> 4(2> PF 3> os |)1 | Chime | era | | | | | | | | | | | | |
| | Arg |)> 7(Leu | | Ile | | Phe | Ala | Leu | Ala | | Ala | Leu | Ile | Gly | Cys | Ala | |
| | l Gln | Lys | Gly | | 5 Glu | Ser | Ile | Gly | | 10 Cys | Asn | Asn | Ser | | Lys | Asp | |
| | Gly | Asn | | 20 Ser | Ala | Asn | Ser | | 25 Asp | Glu | Ser | Val | _ | 30 Gly | Pro | Asn | |
| | Leu | | 35 Glu | Ile | Ser | Lys | | 40 Ile | Thr | Asp | Ser | | Ala | Val | Leu | Leu | |
| | Ala 65 | 50 Val | Lys | Glu | Val | Glu 70 | 55 Ala | Leu | Leu | Ser | Ser 75 | 60 Ile | Asp | Glu | Leu | Ala 80 | |

DODAYNO " OF ABBUD

```
Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp Gly Ser Leu Asp Asn Glu
                85
Ala Asn Arg Asn Glu Ser Leu Leu Ala Gly Ala Tyr Thr Ile Ser Thr
            700
                                 105
                                                     110
Leu Ile Thr Gin Lys Leu Ser Lys Leu Asn Gly Ser Glu Gly Leu Lys
                            120
                                                 125
        115
Glu Lys Ile Ala Ala Ala Lys Lys Cys Ser Glu Glu Phe Ser Thr Lys
                        135
                                             140
Leu Lys Asp Asn Nis Ala Gln Leu Gly Ile Gln Gly Val Thr Asp Glu
                                         155
                    150
Asn Ala Lys Lys Ala Ile Leu Lys Ala Asn Ala Ala Gly Lys Asp Lys
                                                         175
                                     170
                165
Gly Val Glu Glu Leu\Glu Lys Leu Ser Gly Ser Leu Glu Ser Leu Ser
            180
                                 185
                                                     190
Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val Lys Glu Leu Thr Ser
                                                 205
        195
                            200
Pro Val Val His Gly Ash Asn Ser Gly Gly Asp Ser Ala Ser Thr Asn
                                             220
                        215
Pro Asp Glu Ser Ala Lys\Gly Pro Asn Leu Thr Val Ile Ser Lys Lys
                    230
                                         235
Ile Thr Asp Ser Asn Ala Phe Leu Leu Ala Val Lys Glu Val Glu Ala
                245
                                     250
Leu Leu Ser Ser Ile Asp Glu Leu Ser Lys Ala Ile Gly Lys Lys Ile
            260
                                265
                                                     270
Lys Asn Asp Gly Thr Leu Asp Asn Glu Ala Asn Arg Asn Glu Ser Leu
        275
                            280
                                                 285
Ile Ala Gly Ala Tyr Glu Ile Ser Lys Leu Ile Thr Gln Lys Leu Ser
                                             300
                        295
Val Leu Asn Ser Glu Glu Leu L∖xs Lys Lys Ile Lys Glu Ala Lys Asp
                    310
                                         315
Cys Ser Gln Lys Phe Thr Thr Lys Leu Lys Asp Ser His Ala Glu Leu
                325
                                     330
Gly Ile Gln Ser Val Gln Asp Asp Asn Ala Lys Lys Ala Ile Leu Lys
                                 3\∤5
                                                     350
Thr His Gly Thr Lys Asp Lys Gly Ala Lys Glu Leu Glu Glu Leu Phe
                            360
                                                 365
Lys Ser Leu Glu Ser Leu Ser Lys Ala\Ala Gln Ala Ala Leu Thr Asn
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                                             380
Ser Val Lys Glu Leu Thr Asn Pro Val Val Ala Glu Ser Pro Lys Lys
                                         395
385
Pro
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<212> DNA
<213> ospC Chimera

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Met Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys
1
15
```

| gca Ala | caa Gln | aaa Lys | ggt Gly 20 | gct Ala | gag Glu | tca Ser | att Ile | gga Gly 25 | tcc Ser | tgt Cys | aat Asn | aat Asn | tca Ser 30 | gga Gly | aaa Lys | 96 |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----|
| gat Asp | ggg Gly | aat Asn 35 | gca Ala | tct Ser | gca Ala | aat Asn | tct Ser 40 | gct Ala | gat Asp | gag Glu | tct Ser | gtt Val 45 | aaa Lys | ggg Gly | cct Pro | 144 |
| aat Asn | ctt Leu 50 | aca Thr | gaa Glu | ata Ile | agt Ser | aaa Lys 55 | aaa Lys | att Ile | aca Thr | gaa Glu | tct Ser 60 | aac Asn | gca Ala | gtt Val | gtt Val | 192 |
| ctg Leu 65 | gcc Ala | gtg Val | aaa Lys | gaa Glu | gtt Val 70 | gag Glu | acc Thr | tta Leu | ctt Leu | gca Ala 75 | tct Ser | ata Ile | gat Asp | gaa Glu | ctt Leu 80 | 240 |
| gct Ala | acc Thr | aaa Lys | gct Ala | att Ile 85 | ggt Gly | aaa Lys | aaa Lys | ata Ile | ggc Gly 90 | aat Asn | aat Asn | ggt Gly | tta Leu | gag Glu 95 | gcc Ala | 288 |
| aat Asn | cag Gln | agt Ser | aaa Lys 100 | aac Asn | aca Thr | tca Ser | ttg Leu | tta Leu 105 | tca Ser | gga Gly | gct Ala | tat Tyr | gca Ala 110 | ata Ile | tct Ser | 336 |
| gac Asp | cta Leu | ata Ile 115 | gca Ala | gaa Glu | aaa Lys | tta Leu | aat Asn 120 | gta Val | ttg Leu | aaa Lys | aat Asn | gaa Glu 125 | gaa Glu | tta Leu | aag Lys | 384 |
| gaa Glu | aag Lys 130 | att Ile | gat Asp | aca Thr | gct Ala | aag Lys 135 | caa Gln | tot Cys | tct Ser | aca Thr | gaa Glu 140 | ttt Phe | act Thr | aat Asn | aaa Lys | 432 |
| cta Leu 145 | aaa Lys | agt Ser | gaa Glu | cat His | gca Ala 150 | gtg Val | ctt Leu | ggt Gly | ctg Leu | gac Asp 155 | aat Asn | ctt Leu | act Thr | gat Asp | gat Asp 160 | 480 |
| aat Asn | gca Ala | caa Gln | aga Arg | gct Ala 165 | att Ile | tta Leu | aaa Lys | aaa Lys | cat His 170 | gca Ala | aat Asn | aaa Lys | gat Asp | aag Lys 175 | ggt Gly | 528 |
| gct Ala | gca Ala | gaa Glu | ctt Leu 180 | gaa Glu | aag Lys | tta Leu | ttt Phe | aaa Lys 185 | gcg Ala | gta Val | gaa Glu | aac Asn | tta Leu 190 | tca Ser | aaa Lys | 576 |
| gca Ala | gct Ala | caa Gln 195 | gac Asp | aca Thr | tta Leu | aaa Lys | aat Asn 200 | gct Ala | gtt Val | aaa Lys | gag Glu | ctt Leu 205 | aca Thr | agt Ser | cct Pro | 624 |
| att Ile | gtc Val 210 | cat His | ggt Gly | aat Asn | aat Asn | tca Ser 215 | ggg Gly | aaa Lys | gat Asp | ggg Gly | aat Asn 220 | aca Thr | tct Ser | gca Ala | aat Asn | 672 |
| tct Ser 225 | gct Ala | gat Asp | gag Glu | tct Ser | gtt Val 230 | aaa Lys | ggg Gly | cct Pro | aat Asn | ctt Leu 235 | aca Thr | gaa Glu | ata Mle | agt Ser | aaa Lys 240 | 720 |
| aaa Lys | att Ile | aca Thr | gaa Glu | tct Ser 245 | aac Asn | gca Ala | gtt Val | gtt Val | ctc Leu 250 | gcc Ala | gtg Val | aaa Lys | gaa Glu | gtt Val 255 | gaa Glu | 768 |

act ttg ctt aca tct ata gat gag ctt gct aaa gct att ggt aaa aaa 816 Thr Leu Leu Thr Ser Ile Asp Glu Leu Ala Lys Ala Ile Gly Lys Lys 200 265 ata aaa aac gat\gtt agt tta gat aat gag gca gat cac aac gga tca Ile Lys Asn Asp\Val Ser Leu Asp Asn Glu Ala Asp His Asn Gly Ser 864 280 275 912 Leu Ile Ser Gly Ala Tyr Leu Ile Ser Asn Leu Ile Thr Lys Lys Ile 290 295 960 agt gca ata aaa gat tca gga gaa ttg aag gca gaa att gaa aag gct Ser Ala Ile Lys Asp Ser Gly Glu Leu Lys Ala Glu Ile Glu Lys Ala 370 1008 aag aaa tgt tct gaa gaa ttt act gct aaa tta aaa ggt gaa cac aca Lys Lys Cys Ser Glu Glu\Phe Thr Ala Lys Leu Lys Gly Glu His Thr 325 330 gat ctt ggt aaa gaa ggc gtt act gat gat aat gca aaa aaa gcc att 1056 Asp Leu Gly Lys Glu Gly Va\l Thr Asp Asp Asn Ala Lys Lys Ala Ile 345 340 tta aaa aca aat aat gat aaa \act aag ggc gct gat gaa ctt gaa aag 1104 Leu Lys Thr Asn Asn Asp Lys Thr Lys Gly Ala Asp Glu Leu Glu Lys 355 tta ttt gaa tca gta aaa aac ttb tca aaa gca gct aaa gag atg ctt 1152 Leu Phe Glu Ser Val Lys Asn Leu Ser Lys Ala Ala Lys Glu Met Leu 370 375 act aat tca gtt aaa gag ctt aca agc 1179 Thr Asn Ser Val Lys Glu Leu Thr Ser <210> 72 <211> 392 <212> PRT <213> ospC Chimera <400> 72 Arg Leu Leu Ile Gly Phe Ala Leu Ala Le $\mathfrak d$ Ala Leu Ile Gly Cys Ala 10 Gln Lys Gly Ala Glu Ser Ile Gly Ser Cys \Asn Asn Ser Gly Lys Asp 25 Gly Asn Ala Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Glu Sek Asn Ala Val Val Leu Ala Val Lys Glu Val Glu Thr Leu Leu Ala Ser le Asp Glu Leu Ala 75 Thr Lys Ala Ile Gly Lys Lys Ile Gly Asn Asn Gly Leu Glu Ala Asn 90 Gln Ser Lys Asn Thr Ser Leu Leu Ser Gly Ala Tyr Ala Ile Ser Asp

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- Domosaramana
```

84/102 Leu Ile Ala Glu Lys Leu Asn Val Leu Lys Asn Glu Glu Leu Lys Glu 125 120 115 Lys Ile Asp Thr Ala Lys Gln Cys Ser Thr Glu Phe Thr Asn Lys Leu 140 135 130 Lys Ser Glu Has Ala Val Leu Gly Leu Asp Asn Leu Thr Asp Asp Asn 155 150 Ala Gln Arg Ala\Ile Leu Lys Lys His Ala Asn Lys Asp Lys Gly Ala 175 170 \165 Ala Glu Leu Glu Dys Leu Phe Lys Ala Val Glu Asn Leu Ser Lys Ala 190 185 180 Ala Gln Asp Thr Let Lys Asn Ala Val Lys Glu Leu Thr Ser Pro Ile 205 200 Val His Gly Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser 220 215 Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys 235 230 Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Val Glu Thr 250 245 Leu Leu Thr Ser Ile Asp Glu Leu Ala Lys Ala Ile Gly Lys Lys Ile 265 260 Lys Asn Asp Val Ser Leu Asp Asn Glu Ala Asp His Asn Gly Ser Leu 280 275 Ile Ser Gly Ala Tyr Leu Ile\Ser Asn Leu Ile Thr Lys Lys Ile Ser 300 295 Ala Ile Lys Asp Ser Gly Glu Leu Lys Ala Glu Ile Glu Lys Ala Lys 315 310 Lys Cys Ser Glu Glu Phe Thr Ala Lys Leu Lys Gly Glu His Thr Asp 330 325 Leu Gly Lys Glu Gly Val Thr Asp\Asp Asn Ala Lys Lys Ala Ile Leu 340 Lys Thr Asn Asn Asp Lys Thr Lys Gty Ala Asp Glu Leu Glu Lys Leu 360 Phe Glu Ser Val Lys Asn Leu Ser Ly& Ala Ala Lys Glu Met Leu Thr 375 370 Asn Ser Val Lys Glu Leu Thr Ser <210> 73 <211> 1178 <212> DNA <213> ospC Chimera <220> <221> CDS <222> (1)...(1178) <400> 73 atg aga tta tta ata gga ttt gct tta gcg tta gct tta ata gga tgt Met Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys gca caa aaa ggt gct gag tca att gga tcc tgt aat aat tca gga aaa 96 Ala Gln Lys Gly Ala Glu Ser Ile Gly Ser Cys Asn Asn Ser Gly Lys gat ggg aat gca tct gca aat tct gct gat gag tct gtt \aaa ggg cct 144 Asp Gly Asn Ala Ser Ala Asn Ser Ala Asp Glu Ser Val tys Gly Pro 40 35

aat ctt \aca gaa ata agt aaa aaa att aca gaa tct aac gca gtt gtt Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val 50 ctg gcc gtg aaa gaa gtt gag acc tta ctt gca tct ata gat gaa ctt Leu Ala Val Ays Glu Val Glu Thr Leu Leu Ala Ser Ile Asp Glu Leu gct acc aaa gct att ggt aaa aaa ata ggc aat aat ggt tta gag gcc Ala Thr Lys Ala\Ile Gly Lys Lys Ile Gly Asn Asn Gly Leu Glu Ala aat cag agt aaa aac aca tca ttg tta tca gga gct tat gca ata tct Asn Gln Ser Lys Asn Thr Ser Leu Leu Ser Gly Ala Tyr Ala Ile Ser 100 384 Asp Leu Ile Ala Glu Lys Leu Asn Val Leu Lys Asn Glu Glu Leu Lys 120 115 gaa aag att gat aca gct aag caa tgt tct aca gaa ttt act aat aaa 432 Glu Lys Ile Asp Thr Ala Lys Gln Cys Ser Thr Glu Phe Thr Asn Lys 130 139 cta aaa agt gaa cat gca gtg Δ tt ggt ctg gac aat ctt act gat gat 480 Leu Lys Ser Glu His Ala Val Lau Gly Leu Asp Asn Leu Thr Asp Asp 150 528 aat gca caa aga gct att tta aaa aaa cat gca aat aaa gat aag ggt Asn Ala Gln Arg Ala Ile Leu Lys L\gs His Ala Asn Lys Asp Lys Gly 165 gct gca gaa ctt gaa aag tta ttt aaa \qcg gta gaa aac tta tca aaa 576 Ala Ala Glu Leu Glu Lys Leu Phe Lys Ala Val Glu Asn Leu Ser Lys 185 180 gca gct caa gac aca tta aaa aat gct gtt\aaa gag ctt aca agt cct Ala Ala Gln Asp Thr Leu Lys Asn Ala Val Lys Glu Leu Thr Ser Pro 624 205 195 672 att gtc cat ggt aat aat tca gga aaa gat ggg aat aca tct gca aat Ile Val His Gly Asn Asn Ser Gly Lys Asp Gly\Asn Thr Ser Ala Asn 210 tct gct gat gag tct gtt aaa ggg cct aat ctt aca gaa ata agt aaa 720 Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys 235 aaa att aca gaa tct aac gca gtt gtt ctg gct gtg aaa gaa att gaa 768 Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Ile Glu act ttg ctt gca tct ata gat gaa ctt gct act aaa gct at ggt aaa 816 Thr Leu Leu Ala Ser Ile Asp Glu Leu Ala Thr Lys Ala I Le Gly Lys 265

| | | | | | | | | | 86/1 | .02 | | | | | | |
|-------------------|----------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| aaa Lys | ata Ile | caa Gln 275 | caa Gln | aat Asn | ggt Gly | ggt Gly | tta Leu 280 | gct Ala | gtc Val | gaa Glu | gcg Ala | ggg Gly 285 | cat His | aat Asn | gga Gly | 864 |
| aca Thr | ttg Leu 290 | tta Leu | gca Ala | ggt Gly | gct Ala | tat Tyr 295 | aca Thr | ata Ile | tca Ser | aaa Lys | cta Leu 300 | ata Ile | aca Thr | caa Gln | aaa Lys | 912 |
| tta Leu 305 | gat Asp | gga Gly | t dg Leu | aaa Lys | aat Asn 310 | tca Ser | gaa Glu | aaa Lys | tta Leu | aag Lys 315 | gaa Glu | aaa Lys | att Ile | gaa Glu | aat Asn 320 | 960 |
| gct Ala | aag Lys | aaa Lys | tgt Cys | tet Ser 325 | gaa Glu | gat Asp | ttt Phe | act Thr | aaa Lys 330 | aaa Lys | cta Leu | gaa Glu | gga Gly | gaa Glu 335 | cat His | 1008 |
| gcg Ala | caa Gln | ctt Leu | gga Gly 340 | att Ile | gaa Glu | aat Asn | gtt Val | act Thr 345 | gat Asp | gag Glu | aat Asn | gca Ala | aaa Lys 350 | aaa Lys | gct Ala | 1056 |
| att Ile | tta Leu | ata Ile 355 | aca Thr | gat Asp | gca Ala | gct Ala | aaa Lys 360 | gat Asp | aag Lys | ggc Gly | gct Ala | gca Ala 365 | gag Glu | ctt Leu | gaa Glu | 1104 |
| aag Lys | cta Leu 370 | ttt Phe | aaa Lys | gca Ala | gta Val | gaa Glu 375 | aad Asn | ttg Leu | gca Ala | aaa Lys | gca Ala 380 | gct Ala | aaa Lys | gag Glu | atg Met | 1152 |
| ctt Leu 385 | gct Ala | aat Asn | tca Ser | gtt Val | aaa Lys 390 | gag Glu | ctt Leu | ac | | | | | | | | 1178 |
| <21 <21 | 0> 74 1> 39 2> PI 3> os | 91 RT | Chim | era | | | | | ` | | \ | | | | | |
| <40 | 0> 74 | 4 | | ~ 3 | | | • | 7.1 - | T | 71. | 7. | Tla | C1., | Cvc | Nla | |
| 1 | Leu | | | 5 | | | | | 10 | | , | \ | | 15 | | |
| Gln | Lys | Gly | Ala 20 | Glu | Ser | Ile | Gly | Ser 25 | Cys | Asn | Asn | Ser | Gly 30 | Lys | Asp | |
| Gly | Asn | | | Ala | Asn | Ser | Ala 40 | Asp | Glu | Ser | Val | Lys 45 | Gly | Pro | Asn | |
| Leu | Thr | 35 Glu | Ile | Ser | Lys | Lys 55 | | Thr | Glu | Ser | Asn 60 | | Val | Val | Leu | |
| | 50 Val | Lys | Glu | Val | Glu 70 | | Leu | Leu | Ala | Ser 75 | | Asp | GJ/A | Leu | Ala 80 | |
| 65 Thr | Lys | Ala | Ile | | | Lys | Ile | Gly | Asn | | Gly | Leu | Glu | Ala | Asn | |
| Gln | Ser | Lys | | | Ser | Leu | Leu | Ser 105 | 90 Gly | Ala | Tyr | Ala | Ile 110 | ser | Asp | |
| Leu | Ile | | | | Leu | Asn | Val | Leu | | Asn | Glu | Glu 125 | Leu | | Glu | |
| Lys | | | Thr | Ala | Lys | Gln | 120 Cys | Ser | Thr | Glu | Phe | Thr | | Lys | Leu | |
| Lys 145 | | Glu | His | Ala | Val 150 | | | Leu | Asp | Asn 155 | 140 Leu | | Asp | Asp | Asn 160 | \ |

Ala Gln Ar& Ala Ile Leu Lys Lys His Ala Asn Lys Asp Lys Gly Ala 170 165 Ala Glu Leu Çlu Lys Leu Phe Lys Ala Val Glu Asn Leu Ser Lys Ala 190 185 1/80 Ala Gln Asp Thr Leu Lys Asn Ala Val Lys Glu Leu Thr Ser Pro Ile 200 195 Val His Gly Asn\Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser 215 Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys 240 230 Ile Thr Glu Ser Ash Ala Val Val Leu Ala Val Lys Glu Ile Glu Thr 245 Leu Leu Ala Ser Ile \Asp Glu Leu Ala Thr Lys Ala Ile Gly Lys Lys 270 265 260 Ile Gln Gln Asn Gly G \P y Leu Ala Val Glu Ala Gly His Asn Gly Thr 280 Leu Leu Ala Gly Ala Tyt Thr Ile Ser Lys Leu Ile Thr Gln Lys Leu 295 Asp Gly Leu Lys Asn Ser 🖟 lu Lys Leu Lys Glu Lys Ile Glu Asn Ala 310 Lys Lys Cys Ser Glu Asp Phe Thr Lys Lys Leu Glu Gly Glu His Ala 330 325 Gln Leu Gly Ile Glu Asn Val\ Thr Asp Glu Asn Ala Lys Lys Ala Ile 350 345 340 Leu Ile Thr Asp Ala Ala Lys **A**sp Lys Gly Ala Ala Glu Leu Glu Lys 3/60 Leu Phe Lys Ala Val Glu Asn Le $oldsymbol{\psi}$ Ala Lys Ala Ala Lys Glu Met Leu 375 Ala Asn Ser Val Lys Glu Leu <210> 75 <211> 1178 <212> DNA <213> ospC Chimera <220> <221> CDS <222> (1)...(1178) <400> 75 atg aga tta tta ata gga ttt gct tta gcg tta gct tta ata gga tgt 48 Met Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu\Ala Leu Ile Gly Cys gca caa aaa ggt gct gag tca att gga tcc tgt aat tca gga aaa 96 Ala Gln Lys Gly Ala Glu Ser Ile Gly Ser Cys Ash Asn Ser Gly Lys gat ggg aat gca tct gca aat tct gct gat gag tct 🐧 tt aaa ggg cct 144 Asp Gly Asn Ala Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro 35 aat ctt aca gaa ata agt aaa aaa att aca gaa tct aac \gca gtt gtt 192 Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val 60 50

| | | • | | | | | | | | 00/1 | 102 | | | | | | |
|---|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----|
| | ctg Leu 65 | gcc Ala | gtg Val | aaa Lys | gaa Glu | gtt Val 70 | gag Glu | acc Thr | tta Leu | ctt Leu | gca Ala 75 | tct Ser | ata Ile | gat Asp | gaa Glu | ctt Leu 80 | 240 |
| | gct Ala | acc Thr | aaa Lys | gct Ala | att Ile 85 | ggt Gly | aaa Lys | aaa Lys | ata Ile | ggc Gly 90 | aat Asn | aat Asn | ggt Gly | tta Leu | gag Glu 95 | gcc Ala | 288 |
| | aat Asn | cag Gln | agt Ser | aaa Lys 100 | aac Asn | aca Thr | tca Ser | ttg Leu | tta Leu 105 | tca Ser | gga Gly | gct Ala | tat Tyr | gca Ala 110 | ata Ile | tct Ser | 336 |
| | gac Asp | cta Leu | ata Ile 115 | gca Ala | gaa Glu | aaa Lys | tta Leu | aat Asn 120 | gta Val | ttg Leu | aaa Lys | aat Asn | gaa Glu 125 | gaa Glu | tta Leu | aag Lys | 384 |
| | gaa Glu | aag Lys 130 | att Ile | gat Asp | aca Thr | gct Ala | aag Lys 135 | caa Gln | tgt Cys | tct Ser | aca Thr | gaa Glu 140 | ttt Phe | act Thr | aat Asn | aaa Lys | 432 |
| | cta Leu 145 | aaa Lys | agt Ser | gaa Glu | cat His | gca Ala 150 | gtg Val | att Leu | ggt Gly | ctg Leu | gac Asp 155 | aat Asn | ctt Leu | act Thr | gat Asp | gat Asp 160 | 480 |
| | aat Asn | gca Ala | caa Gln | aga Arg | gct Ala 165 | att Ile | tta Leu | aaa Lys | aaa Lys | cat His 170 | gca Ala | aat Asn | aaa Lys | gat Asp | aag Lys 175 | ggt Gly | 528 |
| | gct Ala | gca Ala | gaa Glu | ctt Leu 180 | gaa Glu | aag Lys | tta Leu | ttt Phe | aaa Lys 185 | gcg Ala | gta Val | gaa Glu | aac Asn | tta Leu 190 | tca Ser | aaa Lys | 576 |
| 1 | gca Ala | gct Ala | caa Gln 195 | gac Asp | aca Thr | tta Leu | aaa Lys | aat Asn 200 | gct Ala | gtt Val | aaa Lys | gag Glu | ctt Leu 205 | aca Thr | agt Ser | cct Pro | 624 |
| | att | gtc Val 210 | cat His | ggt Gly | aat Asn | aat Asn | tca Ser 215 | aga Arg | aaa Lys | gat Asp | gg9 | aat Asn 220 | gca Ala | tct Ser | aca Thr | aat Asn | 672 |
| | tct Ser 225 | gcc Ala | gat Asp | gag Glu | tct Ser | gtt Val 230 | aaa Lys | ggg Gly | cct Pro | aat Asn | ctt Leu 235 | aca Thr | gaa Glu | ata Ile | agt Ser | aaa Lys 240 | 720 |
| | Lys | Ile | Thr | Glu | Ser 245 | Asn | Ala | Val | Val | Leu 250 | Ala | gtg Val | Γλ. | Glu | Val 255 | GLu | 768 |
| | acc Thr | tta Leu | ctt Leu | gca Ala 260 | Ser | ata Ile | gat Asp | gaa Glu | ctt Leu 265 | gct Ala | acc Thr | aaa Lys | gct Ala | att Ile 270 | ggt Gly \ | aag Lys | 816 |
| | aaa Lys | ata Ile | ggc Gly 275 | Asn | aat Asn | ggt Gly | tta Leu | gag Glu 280 | Ala | aat Asn | cag Gln | agt Ser | aaa Lys 285 | aac Asn | aca Thr | tca Ser | 864 |
| | ttg Leu | tta Leu 290 | Ser | gga Gly | gct Ala | tat Tyr | gca Ala 295 | Ile | tct Ser | gac Asp | cta Leu | ata Ile 300 | Ala | gaa Glu | aaa Lys | tta Leu | 912 |
| | 1 | | | | | | | | | | | | | | | ١. | |

| 1 | |
|--|--|
| aat gta ttg aaa aat gaa gaa tta aag gaa aag att gat aca gct aa Asn Val Leu Lys Asn Glu Glu Leu Lys Glu Lys Ile Asp Thr Ala Ly 305 310 315 | ag 960 7s 20 |
| caa tgt tct aca gaa ttt act aat aaa cta aaa agt gaa cat gca g Gln Cys Ser Thr Glt Phe Thr Asn Lys Leu Lys Ser Glu His Ala Va 325 330 335 | g 1008 al |
| ctt ggt ctg gac aat ctt act gat gat aat gca caa aga gct att te Leu Gly Leu Asp Asn Leu Thr Asp Asp Asn Ala Gln Arg Ala Ile Leu 340 345 350 | ta 1056 eu |
| aaa aaa cat gca aat aaa gat aag ggt gct gca gaa ctt gaa aag t Lys Lys His Ala Asn Lys Asp Lys Gly Ala Ala Glu Leu Glu Lys L 355 360 365 | ta 1104 eu |
| ttt aaa gcg gta gaa aac tta tca aaa gca gct caa gac aca tta a Phe Lys Ala Val Glu Asn Leu Ser Lys Ala Ala Gln Asp Thr Leu L 370 375 380 | aa 1152 ys |
| aat gct gtt aaa gag ctt aca agt cc Asn Ala Val Lys Glu Leu Thr Ser 385 390 | 1178 |
| <210> 76 <211> 391 <212> PRT <213> ospC Chimera | |
| <pre><400> 76 Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys A 10 15</pre> | la |
| Gln Lys Gly Ala Glu Ser Ile Gly Ser Cys Asn Asn Ser Gly Lys A | sp |
| Gly Asn Ala Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro A | sn |
| Leu Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val I | eu |
| 50 55 \ 60 | |
| Ala Val Lys Glu Val Glu Thr Leu Leu Ala Set Ile Asp Glu Leu F | Ala 80 |
| Ala Val Lys Glu Val Glu Thr Leu Leu Ala Set Ile Asp Glu Leu A 65 70 75 Thr Lys Ala Ile Gly Lys Lys Ile Gly Asn Asn Gly Leu Glu Ala A | 0 |
| Ala Val Lys Glu Val Glu Thr Leu Leu Ala Set Ile Asp Glu Leu A 65 70 75 Thr Lys Ala Ile Gly Lys Lys Ile Gly Asn Asn Gly Leu Glu Ala A 85 90 95 Gln Ser Lys Asn Thr Ser Leu Leu Ser Gly Ala Tyr Ala Ile Ser A | Asn |
| Ala Val Lys Glu Val Glu Thr Leu Leu Ala Set Ile Asp Glu Leu A A A Set Ile Asp Glu Leu A A A Set Ile Asp Glu Leu A A A A Set Ile Asp Glu Leu A A A A Set Ile Asp Glu Leu A A A A A A Set Ile Asp Glu Leu A A A A A A A A A A A A A A A A A A A | Asn Asp |
| Ala Val Lys Glu Val Glu Thr Leu Leu Ala Set Ile Asp Glu Leu A A A Set Ile Asp Glu Leu A A A Set Ile Asp Glu Ala Asp Glu Ala Asp Glu Ala Asp Glu Ala Asp Glu Ala Asp Glu Ala Asp Glu Asp Glu Leu Lys Asp Glu Asp Glu Leu Lys Glu Leu Lys Ile Asp Thr Ala Lys Glu Cys Ser Thr Glu Phe Thr Asp Lys Ile Asp Thr Ala Lys Glu Cys Ser Thr Glu Phe Thr Asp Lys Ile Asp Thr Ala Lys Glu Cys Ser Thr Glu Phe Thr Asp Lys Ile Asp Thr Ala Lys Glu Cys Ser Thr Glu Phe Thr Asp Lys Ile Asp Thr Ala Lys Glu Cys Ser Thr Glu Phe Thr Asp Lys Ile Asp Thr Ala Lys Glu Cys Ser Thr Glu Phe Thr Asp Lys Ile Asp Thr Asp Lys Ile Asp Thr Asp Lys Ile Asp Thr Ala Lys Glu Cys Ser Thr Glu Phe Thr Asp Lys Ile Asp Thr Asp Ly | Asn Asp Glu |
| Ala Val Lys Glu Val Glu Thr Leu Leu Ala Set Ile Asp Glu Leu A A Asp Gly Leu Glu Ala Asp Glu Ala Asp Glu Ala Asp Asp Asp Asp Asp Asp Asp Asp Asp Asp | Asn Asp Glu Leu Asn |
| Ala Val Lys Glu Val Glu Thr Leu Leu Ala Set Ile Asp Glu Leu A A A Set Ile Asp Glu Ala Asp Gly Leu Glu Ala A A Set Ile Asp Glu Ala Asp Gly Leu Glu Ala Asp Glu Ala Tyr Ala Ile Ser A Ileu Ileu Ala Glu Lys Leu Asn Val Leu Lys Asn Glu Glu Leu Lys Glu Ileu Ileu Ileu Ileu Ileu Ileu Ileu Il | Asp Slu Leu Asn 160 |
| Ala Val Lys Glu Val Glu Thr Leu Leu Ala Set Ile Asp Glu Leu Ala Set Ile Asp Glu Leu Ala Set Ile Asp Glu Leu Ala Ile Gly Lys Lys Ile Gly Asn Asn Gly Leu Glu Ala A 90 95 Gln Ser Lys Asn Thr Ser Leu Leu Ser Gly Ala Tyr Ala Ile Ser A 100 105 110 Leu Ile Ala Glu Lys Leu Asn Val Leu Lys Asn Glu Glu Leu Lys Gly Ile Asp Thr Ala Lys Gln Cys Ser Thr Glu Phe Thr Asn Lys Iley Ser Glu His Ala Val Leu Gly Leu Asp Asn Leu Thr Asp Asp Iley Ser Glu His Ala Val Leu Gly Leu Asp Asn Leu Thr Asp Asp Iley Iley Ser Glu His Ala Val Leu Gly Leu Asp Asn Leu Thr Asp Asp Iley Iley Ser Glu His Ala Val Leu Gly Leu Asp Asn Leu Thr Asp Asp Iley Iley Ser Glu His Ala Val Leu Gly Leu Asp Asn Leu Thr Asp Asp Iley Iley Ser Glu His Ala Val Leu Gly Leu Asp Asn Leu Thr Asp Asp Iley Iley Iley Ser Glu His Ala Val Leu Gly Leu Asp Asn Leu Thr Asp Asp Iley Iley Iley Ser Glu His Ala Val Leu Gly Leu Asp Asn Leu Thr Asp Asp Iley Iley Iley Iley Ser Glu His Ala Val Leu Gly Leu Asp Asn Leu Thr Asp Asp Iley Iley Iley Iley Iley Iley Iley Iley | Asp Glu Leu Asn 160 Ala |

Sult Al

| 1 | | | | | | 90/1 | | | | | | | |
|---|---|--|--|----------------------------|---------------------------------------|--------------------------|--|----------------------------|---------------------------------------|---------------------------------------|---|--------------------------|-----------|
| Val His Gly\Asn | | | 215 | | | | | 220 | | | | | |
| Ala Asp Glu \$er | Val | | Gly | Pro | Asn | Leu | Thr 235 | Glu | Ile | Ser | Lys | Lys 240 | |
| 225 Ile Thr Glu Ser | 245 | | | | | 250 | Val | | | | 255 | Thr | |
| Leu Leu Ala Se | Ile | Asp | Glu | Leu | Ala 265 | Thr | Lys | Ala | Ile | Gly 270 | Lys | Lys | |
| Ile Gly Asn Asr | Gly | Leu | Glu | Ala 280 | | Gln | Ser | Lys | Asn 285 | Thr | Ser | Leu | |
| 275 Leu Ser Gly Ala | tyr | Ala | Ile 295 | Ser | Asp | Leu | Ile | Ala 300 | | Lys | Leu | Asn | |
| 290 Val Leu Lys Asr | Glu | Glu 310 | Leu | Lys | Glu | Lys | Ile 315 | | Thr | Ala | Lys | Gln 320 | |
| 305 Cys Ser Thr Glu | | Thr | Asn | Lys | Leu | Lys 330 | | Glu | His | Ala | Val 335 | | |
| Gly Leu Asp Asi | | Thr | Asp | Asp | Asn 345 | | Gln | Arg | Ala | Ile 350 | | Lys | |
| 340 Lys His Ala Ası | Lys | Asp | Lys | Gly | Ala | Ala | Glu | Leu | Glu 365 | | Leu | Phe | |
| 355 Lys Ala Val Gli | Asn | Leu | Ser 375 | 360 Lys | Ala | Ala | Gln | Asp 380 | | Leu | Lys | Asn | |
| 370 Ala Val Lys Glu 385 | l Leu | Th. | | | | | | 300 | | | | | |
| | | , | | | | | | | | | | | |
| <210> 77 <211> 1230 <212> DNA <213> ospC Chir | nera | | | | | | | | | | | | |
| <220> <221> CDS <222> (1)(1 | 230) | | 1 | | | | | | | | | | |
| <400> 77 | | | | 1 | | | | | | | | | |
| atg aga tta tt Met Arg Leu Le 1 | a ata ı Ile 5 | gga Gly | ttt Phe | gct Ala | tta Leu \ | gcg Ala 10 | ьeu | gct Ala | tta Leu | ata Ile | gga Gly 15 | Cys | 48 |
| Met Arg Leu Le | ı Ile 5 t gct y Ala | GTA | tca | A1a | ьеи | 10 | ьеи | aat | aat | tca | 15 ggg Gly | aaa | 48 96 |
| Met Arg Leu Le 1 gca caa aaa gg Ala Gln Lys Gl | Ile 5 t gct y Ala | gag Glu | tca Ser | att Ile | gga Gly 25 | 10 tcc Ser | tgt Cys | aat Asn | aat Asn gtt | tca Ser 30 aaa Lys | 15 ggg Gly | aaa Lys | |
| Met Arg Leu Le 1 gca caa aaa gg Ala Gln Lys Gl 2 gat ggg aat ac Asp Gly Asn Th | t gct y Ala 0 a tct | gag Glu gca Ala | tca Ser aat Asn | att Ile tct Ser 40 aaa Lys | gga dly 25 gct Ala | tcc Ser | tgt Cys gag | aat Asn tct Ser | aat Asn gtt Val 45 | tca Ser 30 aaa Lys | ggg Gly ggg Gly | aaa Lys cct Pro | 96 |
| Met Arg Leu Le 1 gca caa aaa gg Ala Gln Lys Gl 2 gat ggg aat ac Asp Gly Asn Th 35 aat ctt aca ga Asn Leu Thr Gl | t gct y Ala 0 a tct r Ser a ata | gag Glu gca Ala Ala ser | tca Ser aat Asn aaa Lys 55 gaa Glu | att Ile tct Ser 40 aaa Lys | gga dly 25 gct Ala att | tcc Ser gat Asp | tgt Cys gag Glu gat Asp | aat Asn tct Ser 60 tct Ser | aat Asn gtt Val 45 aat | tca Ser 30 aaa Lys gcg | ggg Gly ggg Gly ygtt Val | aaa Lys cct Pro | 96 144 |

| | | \ | | | | | | | | | | | | | | | |
|-------------------------------|--------------------|-------------------|---------------------|-------------------|-------------------|--------------------|--------------------|--------------------|----------------------|-------------------|--------------------|---------------------|--------------------|--------------------|-----------------------|-----------------------|-----|
| acc Thr | gaa Glu | tat Tyr | aat Asi 10 | n H | ac a | aat Asn | gga Gly | tca Ser | ttg Leu 105 | tta Leu | gcg Ala | gga Gly | gct Ala | tat Tyr 110 | gca Ala | ata Ile | 336 |
| tca Ser | acc Thr | cta Leu 115 | Il | a e I | aa ys | caa Gln | aaa Lys | tta Leu 120 | gat Asp | gga Gly | ttg Leu | aaa Lys | aat Asn 125 | gaa Glu | gga Gly | tta Leu | 384 |
| aag Lys | gaa Glu 130 | aaa Lys | a at | t ç e <i>P</i> | at | gcg Ala | gct Ala 135 | aag Lys | aaa Lys | tgt Cys | tct Ser | gaa Glu 140 | aca Thr | ttt Phe | act Thr | aat Asn | 432 |
| aaa Lys 145 | tta Leu | aaa Lys | a ga s Gl | a a u I | aaa Lys | cac His 150 | aca Thr | gat Asp | ctt Leu | ggt Gly | aaa Lys 155 | gaa Glu | ggt Gly | gtt Val | act Thr | gat Asp 160 | 480 |
| gct Ala | gat Asp | gca Ala | a aa a Ly | 7S (| gaa Glu 165 | gdc Ala | att Ile | tta Leu | aaa Lys | aca Thr 170 | aat Asn | ggt Gly | act Thr | aaa Lys | act Thr 175 | aaa Lys | 528 |
| ggt Gly | gct Ala | ga Gl | a ga u Gl | Lu : | ctt Leu | gga Gly | aaa Iys | tta Leu | ttt Phe 185 | Gru | tca Ser | gta Val | gag Glu | gtc Val 190 | | tca Ser | 576 |
| aaa Lys | gca Ala | gc Al 19 | a Ly | aa YS | gag Glu | atg Met | ct t | gct Ala 200 | MS11 | tca Ser | gtt Val | aaa Lys | gag Glu 205 | | aca Thr | agc Ser | 624 |
| cct Pro | gtt Val | L Va | g g | ca la | gaa Glu | agt Ser | cca Pro 215 | ∙ гЖз | aaa Lys | cct Pro | tto Phe | c cat His 220 | 2 - 2 | aat Asr | aat Asn | tca Ser | 672 |
| ggt Gl _y 225 | gg Gl | | t t p S | ct er | gca Ala | tct Ser 230 | Thr | aat Asr | cct | gat Asp | gaq Gli 23 | u se. | t gca r Ala | a aaa a Lys | a gga s Gly | r cct Pro 240 | 720 |
| | | t ac u Th | ec g nr V | ta al | ata Ile 245 | Ser | aaa Lys | a aaa s Lys | a att | aca Th: | L 230 | t tc p Se | t aat r Ası | t gca n Ala | a ttt a Phe 25! | tta E Leu | 768 |
| cto Le | g gc u Al | t gt a Va | al L | aa ys 60 | gaa Glu | gtt Val | gaq L Gli | g gct 1 Ala | t tto a Leo 26 | u nc | t tc Se | a tc r Se | t ata | a ga e As 27 | t gaa p Gli 0 | a ctt u Leu | 816 |
| tc Se | t aa r Ly | s A | ct a la I 75 | tt le | ggt Gly | aaa Lys | a aa s Ly | a at s Il 28 | е гл | a aa s As | t ga n As | t gg p Gl | t ac y Th 28 | | a ga u As | t aac p Asn | 864 |
| ga Gl | a gc u Al 29 | a A | at o sn <i>l</i> | ga Arg | aac Asr | gaa n Gl | a tc u Se 29 | rьe | g at u Il | a gc e Al | a gg a Gl | a 90 y Al 30 | £ 1 | t ga r Gl | a at u Il | a tca e Ser | 912 |
| aa Ly 30 | a ct | | ta a le ' | aca Thr | caa Gli | a aa n Ly 31 | ѕ Ье | a ag u Se | ıt gt er Va | a tt | g aa u As 31 | 311 56 | a ga er Gl | a ga .u Gl | a tt u Le | a aag u Lys 320 | |
| | | | | | | | | | | | | | | | | | |

| 92/102 | |
|---|------|
| aaa aaa att aaa gag gct aag gat tgt tcc caa aaa ttt act act aag Lys Lys Ile Lys Glu Ala Lys Asp Cys Ser Gln Lys Phe Thr Thr Lys 325 330 335 | 1008 |
| cta aaa gat agt cat gca gag ctt ggt ata caa agc gtt cag gat gat Leu Lys Asp Ser His Ala Glu Leu Gly Ile Gln Ser Val Gln Asp Asp 340 345 350 | 1056 |
| aat gca aaa aaa gct att tta aaa aca cat gga act aaa gac aag ggt Asn Ala Lys Lys Ala Ile Leu Lys Thr His Gly Thr Lys Asp Lys Gly 355 360 365 | 1104 |
| gct aaa gaa ctt gaa gag tta ttt aaa tca cta gaa agc ttg tca aaa Ala Lys Glu Leu Glu Glu Leu Phe Lys Ser Leu Glu Ser Leu Ser Lys 370 380 | 1152 |
| gca gcg caa gca gca tta act aat tca gtt aaa gag ctt aca aat cct Ala Ala Gln Ala Ala Leu Thr Asn Ser Val Lys Glu Leu Thr Asn Pro 385 390 395 400 | 1200 |
| gtt gtg gca gaa agt cca aaa aaa cct taa Val Val Ala Glu Ser Pro Lys Lys Pro * 405 | 1230 |
| <210> 78 <211> 408 <212> PRT <213> ospC Chimera | |
| \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ | |
| <pre><400> 78 Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ile Gly Cys Ala</pre> | |
| <pre><400> 78 Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys Ala 1</pre> | |
| <pre><400> 78 Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys Ala 1</pre> | |
| <pre><400> 78 Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys Ala 1</pre> | |
| <pre><400> 78 Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys Ala 1</pre> | |
| <pre><400> 78 Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys Ala 1</pre> | |
| <pre><400> 78 Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys Ala 1</pre> | |
| <pre><400> 78 Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys Ala 1</pre> | |
| <pre><400> 78 Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys Ala 1</pre> | |
| <pre><400> 78 Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys Ala 1</pre> | |
| Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys Ala 1 | |
| Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys Ala 1 | |
| Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys Ala 1 | |

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|---|----------------------|------------------------------------|--|--|---|----------------------|--------------|-------------------------------|--------------------|----------------|-------------------------|--|--------------|--------------|---------------------------------|--|------------|
| , | Gly | Asp | Ser | Ala | Ser | Thr 230 | Asn | Pro | Asp | Glu | Ser 235 | Ala | Lys | Gly | Pro | Asn 240 | |
| | | | | | Ser 245 | Lys | | | | | Ser | | | | | | |
| | | | | | \\al | | | | | Ser | | | | | | | |
| | Lys | Ala | Ile | 260 Gly | Где | Lys | Ile | Lys 280 | Asn | Asp | Gly | Thr | Leu 285 | Asp | Asn | Glu | |
| | Ala | Asn | 275 Arg | Asn | Glu | Ser | Leu 295 | Ile | Ala | Gly | Ala | Tyr 300 | Glu | Ile | Ser | Lys | |
| | Leu | 290 Ile | Thr | Gln | Lys | Leu | Ser | Val | Leu | Asn | Ser 315 | Glu | Glu | Leu | Lys | Lys 320 | |
| | 305 Lys | Ile | Lys | Glu | Ala | Lya | Asp | Cys | Ser | Gln 330 | Lys | Phe | Thr | Thr | Lys 335 | Leu | |
| | Lys | Asp | Ser | His | 325 Ala | Glu | Leu | Gly | 11e | Gln | Ser | Val | Gln | Asp 350 | Asp | Asn | |
| | | | | | Ile | | | | His | Gly | | | | | | Ala | |
| | | | | Glu | | | | Lуs | Sei | | | | | | | Ala | |
| | | | Ala | Ala | Leu | Thr | 375 Asn | Ser | . Va | Lys | Glu 395 | Let | Thr | Asn | Pro | Val 400 | |
| | 385 Val | Ala | Glu | ser | Pro | 390 Lys | | Pr | \langle | | | | | | | | |
| | | | | | 405 | | | | | | | | | | | | |
| | | 0> 7 | | | | | | | | | | | | | | | |
| | <21 | 1> 1 2> [| NA | | | | | | · | | | | | | | | |
| | <21 | .3> c | spC | Chir | nera | | | | | | | | | | | | |
| | | 21> (| | (1 | 209) | | | | | \ | \ | | | | | | |
| | | 00> . | | | . .+. | | s ++· | t ac | t tt | a qc | a t\t | a qc | t tt | a at | a gg | a tgt y Cys | 48 |
| | ato Met 1 | g aga | a tt g Le | a tt u Le | a ata u Ile 5 | e Gly | y Ph | e Al | a Le | u Ai | a La | u Ál | a Le | u Il | e Gl 1 | y Cys 5 | |
| | gca | a ca | a aa | a gg | t gc | t ga | g tc | a at | t gg | a to | c tg | t aa | t aa n As | t tc n Se | a gg r Gl | g aaa y Lys | 96 |
| | | | | 2 | U | | | | - | | | , | \ | | | | |
| | ga | t gg | or aa | it ac | a to | t ac | a aa | t to | t q | et qa | it qa | g to | :t\ gt | t aa | a gg | g cct y Pro | 144 |
| | | | 9 | | | 71 | - 7.0 | 20 | r Ď | la Ás | n Gl | .ú Sε | r\Va | 1 Бу | 2 01 | ., | |
| | As | p Gl | y As | n Th 35 | ır Se | r Al | a As | n se | 10 | La As | ,p 01 | .u 00 | 4 | 5 | | - | |
| | As | p Gl | y As | in Th | ır Se : | r Al | a As | n se | 10 | t | ra as | at to | at as | 5 .t ac | eg gt | t tta | 192 |
| | As aa As | p Gl t ct n Le | y As tac u Th | on Th 35 ca ga nr Gl | ar Se aa at Lu Il | r Al a ag e Se | t aa r Ly | n se ia aa is Ly | io aa a ys I | tt ac | eg ga | at to | et aa | t go | eg gt La Va | t tta al Leu | 192 |
| | As aa As | p Gl t ct n Le | y As t ac u Th | on The | ir Se na at Lu Il | a ag e Se | t aar Ly | in se ia aa is Ly 55 | aa a ys I | tt ac | eg ga ar As | at to | et ader As | t go | eg gt La Va | t tta al Leu aa att | 192 240 |
| | As As ct | t ct n Le t go t go Al | y As t ac tu Th 0 | in Th 35 ca ga nr Gl tg aa | ar Se na at Lu Il na ga | a age Se | t aar Ly | na aa ys Ly 55 | aa a ays I. | tt ac le Th | eg ga nr As | at to sp Se ca to er So | et ader As | t go | cg gt La Va at ga | at tta al Leu aa att lu Ile 80 | 240 |
| | aa As ct Le | t ct n Le t go | t act of the transfer of the t | in Th 35 ca ga nr Gl tg aa | ar Se aa at Lu Il aa ga ys Gl | a age Se | t aar Ly | na aa ys Ly 55 | aa a ys I. | tt actle Th | eg ga hr As tg to | at to sp Se ca to er Se 75 | et ader As | t go | cg gt La Va at ga sp G | t tta al Leu aa att | |

| acc gaa tat aat cac aat gga tca ttg tta gcg gga gct tat gca ata Thr Glu Tyr Asn His Asn Gly Ser Leu Leu Ala Gly Ala Tyr Ala Ile 100 100 | 336 |
|---|------|
| tca acc cta ata aaa caa aaa tta gat gga ttg aaa aat gaa gga tta Ser Thr Leu Ile Lys Gln Lys Leu Asp Gly Leu Lys Asn Glu Gly Leu 115 | 384 |
| aag gaa aaa att gat gcg gct aag aaa tgt tct gaa aca ttt act aat Lys Glu Lys Ile Asp Ala Lys Lys Cys Ser Glu Thr Phe Thr Asn 130 | 432 |
| aaa tta aaa gaa aaa cac aca gat ctt ggt aaa gaa ggt gtt act gat Lys Leu Lys Glu Lys His Thr Asp Leu Gly Lys Glu Gly Val Thr Asp 150 160 | 480 |
| gct gat gca aaa gaa gcc att tta aaa aca aat ggt act aaa act aaa Ala Asp Ala Lys Glu Ala Ile Leu Lys Thr Asn Gly Thr Lys 165 170 | 528 |
| ggt gct gaa gaa ctt gga aaa tta ttt gaa tca gta gag gtc ttg tca Gly Ala Glu Glu Leu Gly Lys teu Phe Glu Ser Val Glu Val Leu Ser 180 | 576 |
| aaa gca gct aaa gag atg ctt gct aat tca gtt aaa gag ctt aca agc Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val Lys Glu Leu Thr Ser 195 | 624 |
| cct gtt gtg gca gaa agt cca aaa aaa cct tcc atg gta aat aat tca Pro Val Val Ala Glu Ser Pro Lys Lys Pro Ser Met Val Asn Asn Ser 210 | 672 |
| ggg aaa gat ggg aat aca tot gca aat tot gct gat gag tot gtt aaa Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys | 720 |
| ggg cct aat ctt aca gaa ata agt aaa aaa att aca gaa tct aac gca Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala 255 | 768 |
| gtt gtt ctc gcc gtg aaa gaa gtt gaa act ttg ctt aca tct ata gat Val Val Leu Ala Val Lys Glu Val Glu Thr Leu Leu Thr Ser Ile Asp 260 265 270 | 816 |
| gag ctt gct aaa gct att ggt aaa aaa ata aaa aac gat gtt agt tta Glu Leu Ala Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp Val Ser Leu 280 | 864 |
| gat aat gag gca gat cac aac gga tca tta ata tca gga gca tat tta Asp Asn Glu Ala Asp His Asn Gly Ser Leu Ile Ser Gly Ala Tyr Leu 290 295 | 912 |
| att tca aac tta ata aca aaa ata agt gca ata aaa gat tca gga Ile Ser Asn Leu Ile Thr Lys Lys Ile Ser Ala Ile Lys Asp Ser Gly 310 315 320 | |
| gaa ttg aag gca gaa att gaa aag gct aag aaa tgt tct gaa gaa ttt | 1008 |

| | | | | | | | | | | 95/1 | .02 | | | | | | |
|---|-------------------|----------------------------------|-------------------|-------------------|-------------|-------------------|-------------------|-------------------|-------------------|------------|-------------------|-------------------|-------------------|-------------------|------------|-------------------|------|
| , | Glu | Leu : | Lys | Ala \ | Glu 325 | Ile | Glu | Lys | Ala | Lys 330 | Lys | Cys | Ser | Glu | Glu 335 | Phe | |
| | act Thr | gct Ala | Lys | tta Leu 340 | aaa Lys | ggt Gly | gaa Glu | cac His | aca Thr 345 | gat Asp | ctt Leu | ggt Gly | aaa Lys | gaa Glu 350 | ggc Gly | gtt Val | 1056 |
| | act Thr | gat Asp | gat Asp 355 | aat Asn | gca Ala | aaa Lys | aaa Lys | gcc Ala 360 | att Ile | tta Leu | aaa Lys | aca Thr | aat Asn 365 | aat Asn | gat Asp | aaa Lys | 1104 |
| | act Thr | aag Lys 370 | ggc Gly | gct Ala | gat\ Asp | gaa Glu | ctt Leu 375 | gaa Glu | aag Lys | tta Leu | ttt Phe | gaa Glu 380 | tca Ser | gta Val | aaa Lys | aac Asn | 1152 |
| | ttg Leu 385 | tca Ser | aaa Lys | gca Ala | gct Ala | aaa Lys 390 | gag Glu | atg Met | ctt Leu | act Thr | aat Asn 395 | Ser | gtt Val | aaa Lys | gag Glu | ctt Leu 400 | 1200 |
| | | agc Ser | taa * | | | | | | | | | | | | | | 1209 |
| | | | | | | | \ | \ | | | | | | | | | |
| | <213 <213 | 0> 80 1> 40 2> PF 3> os |)1 RT | Chime | era | | | | \ | | | | | | | | |
| | Arg | 0> 80 Leu |) Leu | Ile | Gly | Phe | Ala | Leu | Ala | Leu 10 | Ala | Leu | Ile | Gly | Cys 15 | Ala | |
| | l Gln | Lys | Gly | | Glu | Ser | Ile | Gly | Ser | Cys | Asn | Asn | Ser | Gly 30 | Lys | Asp | |
| | | | 2 5 | | | | | 40 | | 1 | | | 45 | Gly | | Asn | |
| | Leu | | Glu | Ile | Ser | Lys | Lys | Ile | Thr | Ask | Ser | Asn | Ala | Val | Leu | Leu | |
| | | 50 Val | Lys | Glu | Val | Glu 70 | 55 Ala | Leu | Leu | Ser | Ser 75 | | Asp | Glu | ılle | Ala 80 | |
| | 65 Ala | Lys | Ala | Ile | Gly 85 | Lys | Lys | Ile | His | Gln 90 | Astr | n Asn | Gly | Leu | Asp 95 | Thr | |
| | Glu | Tyr | | | Asn | Gly | Ser | Leu | Lev 105 | Ala | Gl | Ala | Tyr | Ala 110 | ı Ile) | Ser | |
| | Thr | Leu | | | Gln | Lys | Leu | Asp 120 | Gly | Let | Lys | s Asn | Glu 125 | Gly | , Leu | Lys | |
| | Glu | | | Asp | Ala | Ala | Lys 135 | Lys | Cys | Ser | Glu | Th. 140 | Phe | | Asr | Lys | |
| | | | Glu | Lys | His | Thr 150 | Asp | Lev | ı Gly | Lys | s Glu 15 | ı Gly 5 | / Val | . Thi | Asp | Ala 160 | |
| | 145 Asp | Ala | Lys | Glu | | Ile | Leu | Lys | s Thi | Ası | Gly | | . Ly | Th | r Lys | Gly | |
| | | | | Leu | 165 Gly | | | | | 170 Sei | J | | | 1 | ı Sei | Lys | |
| 1 | Ala | a Ala | | | , 1 Met | : Le | ı Ala | Ası | n Sei | va. | l Ly | s Glı | Leı 205 | ı Th | | r Pro | |
| 1 | Va] | Val 210 | | Glu | ı Ser | r Pro | Lys 215 | 200 5 Ly: | s Pro | Se: | r Me | t Val 220 | l Ası | | n\Se | r Gly | |
| | | | | | | | | | | | | | | | / | \ | |

| \mathcal{A} | • | | | \ | | | | | | 96/1 | .02 | | | | | | |
|-------------------|-------------------|------------------|------------|------------|-----------------|------------|------------------|------------|------------|------------------|------------|------------------|-------------|------------|------------------|------------|-----|
| Sub A1 | Lys 225 | Asp | Gly | Asn | Thr | Ser 230 | Ala | Asn | Ser | Ala | Asp 235 | Glu | Ser | Val | Lys | Gly 240 | |
| 5 ^{uu} / | Pro | Asn | Leu | Thr | Glu | | Ser | Lys | Lys | Ile 250 | Thr | Glu | Ser | Asn | Ala 255 | Val | |
| / | Val | Leu | Ala | Val 260 | Lys | Glu | Val | Glu | Thr 265 | | Leu | Thr | Ser | Ile 270 | | Glu | |
| | Leu | Ala | Lys 275 | Ala | Ile | gly. | Lys | Lys 280 | Ile | Lys | Asn | Asp | Val 285 | Ser | Leu | Asp | |
| | Asn | Glu 290 | Ala | Asp | His | Asn | Gly 295 | | Leu | Ile | Ser | Gly 300 | | Tyr | Leu | Ile | |
| | Ser 305 | Asn | Leu | Ile | Thr | Lys | | Ile | Ser | Ala | Ile 315 | Lys | Asp | Ser | Gly | Glu 320 | |
| | Leu | Lys | Ala | Glu | Ile 325 | | Lys | Ala | Lys | Lys 330 | Cys | Ser | Glu | Glu | Phe 335 | Thr | |
| | Ala | Lys | Leu | Lys 340 | | Glu | нід | Thr | Asp 345 | | Gly | Lys | Glu | Gly 350 | Val | Thr | |
| | Asp | Asp | Asn | | Lys | Lys | Ala | Tle | Leu | Lys | Thr | Asn | Asn 365 | Asp | Lys | Thr | |
| | Lys | Gly 370 | 355 Ala | Asp | Glu | Leu | Glu 375 | Lys | Leu | Phe | Glu | Ser 380 | | Lys | Asn | Leu | |
| | Ser 385 Ser | Lys | Ala | Ala | Lys | Glu 390 | | Leu | Thr | Asn | Ser 395 | Val | Lys | Glu | Leu | Thr 400 | |
| | | | | | | | | | | | | | | | | | |
| | |)> 8: | | | | | | | \ | | | | | | | | |
| | <212 | L> 12 2> DI | ΑV | ~1 ' | | | | | | | | | | | | | |
| | <21. | 3> 0: | spC (| Jnime | era | | | | | | | | | | | | |
| | | L> CI | DS 1) | . (120 | 05) | | | | | | \ | | | | | | |
| ±5. •£7 | <400 | D> 8: | 1 | | | | | | | | | | | | | | 4.0 |
| | atg Met 1 | aga Arg | tta Leu | tta Leu | ata Ile 5 | gga Gly | ttt Phe | gct Ala | tta Leu | gcg Ala 10 | tta Leu | gct Ala | tta Leu | ata Ile | gga Gly 15 | tgt Cys | 48 |
| | gca | caa | aaa | ggt | gct | gag | tca | att | gga | tcc | tgt | aat | aat | tca | ggg | aaa | 96 |
| | Ala | Gln | Lys | Gly 20 | Ala | Glu | Ser | Ile | Gly 25 | Ser | Cys | Asn | Asn | Ser 30 | GTÀ | ьуs | |
| | gat Asp | ggg Gly | aat Asn | aca Thr | tct Ser | gca Ala | aat Asn | tct Ser | gct Ala | gat Asp | gag Glu | tct Ser | gtt \Val | aaa Lys | ggg Gly | cct Pro | 144 |
| | • | - | 35 | | | | | 40 | | | | | \45 | | | | |
| | aat Asn | ctt Leu 50 | aca Thr | gaa Glu | ata Ile | agt Ser | aaa Lys 55 | aaa Lys | att Ile | acg Thr | gat Asp | tct Ser 60 | alat Asn | gcg Ala | gtt Val | tta Leu | 192 |
| | ctt | gct | gtg | aaa | gag | gtt | gaa | gcg | ttg | ctg | tca | tct | ata | gat | gaa | att | 240 |
| | Leu 65 | | Vaĺ | ьys | Glu | 70 | | ΑΙα | ьeu | ьeu | 5er 75 | | тте | Jap | GIU | 80 | |
| | gct Ala | gct Ala | aaa Lys | gct Ala | att Ile | ggt Gly | aaa Lys | aaa Lys | ata Ile | cac His | caa Gln | aat Asn | aat Asn | gg Gly | ttg Leu | gat Asp | 288 |
| | | | _ | | 85 | | | | | 90 | | | | | 95 | | |

| / | 1 | | | • | | | | | | | 97/1 | 102 | | | | | | |
|--------|---|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----|
| SulpAl | : | acc Thr | gaa Glu | tat Tyr | aat Asn 100 | cac His | aat Asn | gga Gly | tca Ser | ttg Leu 105 | tta Leu | gcg Ala | gga Gly | gct Ala | tat Tyr 110 | gca Ala | ata Ile | 336 |
| | | tca Ser | acc Thr | cta Leu 115 | ata Ile | aaa Lys | caa Gln | aaa Lys | tta Leu 120 | gat Asp | gga Gly | ttg Leu | aaa Lys | aat Asn 125 | gaa Glu | gga Gly | tta Leu | 384 |
| | | aag Lys | gaa Glu 130 | aaa Lys | att Ile | gat Asp | gcg Ala | gct Ala 135 | aag Lys | aaa Lys | tgt Cys | tct Ser | gaa Glu 140 | aca Thr | ttt Phe | act Thr | aat Asn | 432 |
| | : | aaa Lys 145 | tta Leu | aaa Lys | gaa Glu | aaa Lys | dac His 150 | aca Thr | gat Asp | ctt Leu | ggt Gly | aaa Lys 155 | gaa Glu | ggt Gly | gtt Val | act Thr | gat Asp 160 | 480 |
| | | | | | | | | | | | | | | | | act Thr 175 | | 528 |
| | (| ggt Gly | gct Ala | gaa Glu | gaa Glu 180 | ctt Leu | gga Gly | aaa Lys | tta Leu | ttt Phe 185 | gaa Glu | tca Ser | gta Val | gag Glu | gtc Val 190 | ttg Leu | tca Ser | 576 |
| | | aaa Lys | gca Ala | gct Ala 195 | aaa Lys | gag Glu | atg Met | ctt Leu | gct Ala 200 | aat Asn | tca Ser | gtt Val | aaa Lys | gag Glu 205 | ctt Leu | aca Thr | agc Ser | 624 |
| | | | | | | | | | | | | | | | | aat Asn | | 672 |
| | (| gga Gly 225 | aaa Lys | gat Asp | ggg Gly | aat Asn | aca Thr 230 | tct Ser | gca Ala | aat Asn | tct Ser | gct Ala 235 | gat Asp | gag Glu | tct Ser | gtt Val | aaa Lys 240 | 720 |
| | , | ggg Gly | cct Pro | aat Asn | ctt Leu | aca Thr 245 | gaa Glu | ata Ile | agt Ser | aaa Lys | aaa Lys 250 | att | aca Thr | gaa Glu | tct Ser | aac Asn 255 | gca Ala | 768 |
| | ; | gtt Val | gtt Val | ctg Leu | gct Ala 260 | gtg Val | aaa Lys | gaa Glu | att Ile | gaa Glu 265 | act Thr | ttg Leu | ctt Leu | gca Ala | tct Ser 270 | ata Ile | gat Asp | 816 |
| | | gaa Glu | ctt Leu | gct Ala 275 | act Thr | aaa Lys | gct Ala | att Ile | ggt Gly 280 | aaa Lys | aaa Lys | ata Ile | caa Gln | caa Gln 285 | aat Asn | ggt Gly | ggt Gly | 864 |
| | | tta Leu | gct Ala 290 | gtc Val | gaa Glu | gcg Ala | ggg Gly | cat His 295 | aat Asn | gga Gly | aca Thr | ttg Leu | tta Leu 300 | gda Ala | ggt Gly | gct Ala | tat Tyr | 912 |
| | 1 | | | | | | | | | | | | | | | aat Asn | | 960 |

Sub Al

| • | | | | 98/3 | 102 | | | | | | |
|---|---|---|--|--|--|--|--|--|---|--|------|
| gaa aaa tta aag Glu Lys Leu Lys | | | | | | | | | | | 1008 |
| ttt act aaa aaa Phe Thr Lys Lys 340 | | | | | | | | | | | 1056 |
| gtt act gat gag Val Thr Asp Glu 355 | | | Ala | | | | | | | | 1104 |
| aaa gat aag ggc Lys Asp Lys Gly 370 | Ala 🗛 la | gag ctt Glu Lei 375 | gaa Glu | aag Lys | cta Leu | ttt Phe 380 | aaa Lys | gca Ala | gta Val | gaa Glu | 1152 |
| aac ttg gca aaa Asn Leu Ala Lys 385 | gca gct Ala Ala 390 | aaa gaq Lys Glu | ı atg ı Met | ctt Leu | gct Ala 395 | aat Asn | tca Ser | gtt Val | aaa Lys | gag Glu 400 | 1200 |
| ctt ac Leu | | | | | | | | | | | 1205 |
| <210> 82 <211> 400 <212> PRT | | | | | | | | | | | |
| <213> ospC Chime | era | | | | | | | | | | |
| <400> 82 | | | | | | | | | | | |
| _ | | Ala Leu | Ala | Leu 10 | Ala | Leu | Ile | Gly | Cys 15 | Ala | |
| <400> 82 Arg Leu Leu Ile 1 Gln Lys Gly Ala | Gly Phe . | | Ser | 10 | | | | | 15 | | |
| <400> 82 Arg Leu Leu Ile 1 Gln Lys Gly Ala 20 Gly Asn Thr Ser | Gly Phe . 5 Glu Ser | Ile Gly Ser Ala | Ser 25 | 10 Cys | Asn | Asn | Ser Lys | Gly 30 | 15 Lys | Asp | |
| <pre><400> 82 Arg Leu Leu Ile 1 Gln Lys Gly Ala 20 Gly Asn Thr Ser 35 Leu Thr Glu Ile</pre> | Gly Phe 5 5 Glu Ser Ala Asn Ser Lys | Ile Gly Ser Ala 40 Lys Ile | Ser 25 Asp | 10 Cys Glu | Asn Ser | Asn Val Asn | Ser Lys 45 | Gly 30 Gly | 15 Lys Pro | Asp Asn | |
| <pre><400> 82 Arg Leu Leu Ile 1 Gln Lys Gly Ala 20 Gly Asn Thr Ser 35 Leu Thr Glu Ile 50 Ala Val Lys Glu</pre> | Gly Phe . 5 Glu Ser Ala Asn . Ser Lys . | Ile Gly Ser Ala 40 Lys Ile 55 | Ser 25 Asp | 10 Cys Glu Asp Ser | Asn Ser Ser | Asn Val Asn 60 | Ser Lys 45 Ala | Gly 30 Gly Val | 15 Lys Pro Leu | Asp Asn Leu Ala | |
| <pre><400> 82 Arg Leu Leu Ile 1 Gln Lys Gly Ala 20 Gly Asn Thr Ser 35 Leu Thr Glu Ile 50</pre> | Gly Phe 5 Glu Ser Ala Asn Ser Lys Val Glu 70 Gly Lys | Ile Gly Ser Ala 40 Lys Ile 55 Ala Leu | Ser 25 Asp Thr | 10 Cys Glu Asp Ser Gln | Asn Ser Ser Ser | Asn Val Asn 60 Ile | Ser Lys 45 Ala Asp | Gly 30 Gly Val | 15 Lys Pro Leu Ile Asp | Asp Asn Leu Ala 80 | |
| <pre><400> 82 Arg Leu Leu Ile 1 Gln Lys Gly Ala 20 Gly Asn Thr Ser 35 Leu Thr Glu Ile 50 Ala Val Lys Glu 65 Ala Lys Ala Ile Glu Tyr Asn His</pre> | Gly Phe 5 5 Glu Ser Ala Asn Ser Lys Val Glu 70 Gly Lys 85 | Ile Gly Ser Ala 40 Lys Ile 55 Ala Leu | Ser 25 Asp Thr Leu His | Cys Glu Asp Ser Gln 90 | Asn Ser Ser Ser 75 Asn | Asn Val Asn 60 Ile Asn | Ser Lys 45 Ala Asp | Gly 30 Gly Val Glu Leu Ala | 15 Lys Pro Leu Ile Asp 95 | Asp Asn Leu Ala 80 Thr | |
| <pre><400> 82 Arg Leu Leu Ile 1 Gln Lys Gly Ala 20 Gly Asn Thr Ser 35 Leu Thr Glu Ile 50 Ala Val Lys Glu 65 Ala Lys Ala Ile Glu Tyr Asn His 100 Thr Leu Ile Lys</pre> | Gly Phe 5 Glu Ser Ala Asn Ser Lys Val Glu 70 Gly Lys 85 Asn Gly | Ile Gly Ser Ala 40 Lys Ile 55 Ala Leu Lys Ile Ser Leu Leu Asp | Ser 25 Asp Thr Leu 105 Gly | Cys Glu Asp Ser Gln 90 Ala | Asn Ser Ser Ser 75 Asn | Asn Val Asn 60 Ile Asn Ala | Ser Lys 45 Ala Asp Gly Tyr Glu | Gly 30 Gly Val Glu Leu Ala 110 | 15 Lys Pro Leu Ile Asp 95 Ile | Asp Asn Leu Ala 80 Thr | |
| <pre><400> 82 Arg Leu Leu Ile 1 Gln Lys Gly Ala 20 Gly Asn Thr Ser 35 Leu Thr Glu Ile 50 Ala Val Lys Glu 65 Ala Lys Ala Ile Glu Tyr Asn His 100 Thr Leu Ile Lys 115 Glu Lys Ile Asp</pre> | Gly Phe 5 Glu Ser Ala Asn Ser Lys Val Glu 70 Gly Lys 85 Asn Gly Gln Lys Ala Ala | Ile Gly Ser Ala 40 Lys Ile 55 Ala Leu Lys Ile Ser Leu Leu Asp 120 Lys Lys | Ser 25 Asp Thr Leu His Leu 105 Gly | Glu Asp Ser Gln 90 Ala Leu | Asn Ser Ser 75 Asn Gly | Asn Val Asn 60 Ile Asn Ala Asn | Ser Lys 45 Ala Asp Gly Tyr Glu 125 | Gly 30 Gly Val Glu Leu Ala 110 Gly | 15 Lys Pro Leu Ile Asp 95 Ile Leu | Asp Asn Leu Ala 80 Thr Ser Lys | |
| <pre><400> 82 Arg Leu Leu Ile 1 Gln Lys Gly Ala 20 Gly Asn Thr Ser 35 Leu Thr Glu Ile 50 Ala Val Lys Glu 65 Ala Lys Ala Ile Glu Tyr Asn His 100 Thr Leu Ile Lys 115</pre> | Gly Phe 5 Glu Ser Ala Asn Ser Lys Val Glu 70 Gly Lys 85 Asn Gly Gln Lys Ala Ala | Ile Gly Ser Ala 40 Lys Ile 55 Ala Leu Lys Ile Ser Leu Leu Asp 120 Lys Lys 135 | Ser 25 Asp Thr Leu 105 Gly | Glu Asp Ser Gln 90 Ala Leu Ser | Asn Ser Ser 75 Asn Gly Lys | Asn Val Asn 60 Ile Asn Ala Asn Thr | Ser Lys 45 Ala Asp Gly Tyr Glu 125 Phe | Gly 30 Gly Val Glu Leu Ala 110 Gly | 15 Lys Pro Leu Ile Asp 95 Ile Leu Asn | Asp Asn Leu Ala 80 Thr Ser Lys | |
| <pre><400> 82 Arg Leu Leu Ile 1 Gln Lys Gly Ala 20 Gly Asn Thr Ser 35 Leu Thr Glu Ile 50 Ala Val Lys Glu 65 Ala Lys Ala Ile Glu Tyr Asn His 100 Thr Leu Ile Lys 115 Glu Lys Ile Asp 130</pre> | Gly Phe 5 Glu Ser Ala Asn Ser Lys Val Glu 70 Gly Lys 85 Asn Gly Gln Lys Ala Ala His Thr 150 | Ile Gly Ser Ala 40 Lys Ile 55 Ala Leu Lys Ile Ser Leu Leu Asp 120 Lys Lys 135 Asp Leu | Ser 25 Asp Thr Leu 105 Gly Cys | Glu Asp Ser Gln 90 Ala Leu Ser Lys Asn | Asn Ser Ser 75 Asn Gly Lys Glu Glu 155 | Asn Val Asn 60 Ile Asn Ala Asn Thr 140 Gly | Ser Lys 45 Ala Asp Gly Tyr Glu 125 Phe Val | Gly 30 Gly Val Glu Leu Ala 110 Gly Thr | 15 Lys Pro Leu Ile Asp 95 Ile Leu Asn Asp | Asp Asn Leu Ala 80 Thr Ser Lys Lys Ala 160 | |
| <pre><400> 82 Arg Leu Leu Ile 1 Gln Lys Gly Ala 20 Gly Asn Thr Ser 35 Leu Thr Glu Ile 50 Ala Val Lys Glu 65 Ala Lys Ala Ile Glu Tyr Asn His 100 Thr Leu Ile Lys 115 Glu Lys Ile Asp 130 Leu Lys Glu Lys 145</pre> | Gly Phe 5 Glu Ser Ala Asn Ser Lys Val Glu 70 Gly Lys 85 Asn Gly Gln Lys Ala Ala His Thr 150 Ala Ile 165 | Ile Gly Ser Ala 40 Lys Ile 55 Ala Leu Lys Ile Lys Leu Leu Asp 120 Lys Lys 135 Asp Leu Leu Lys | Ser 25 Asp Thr Leu 105 Gly Cys Gly | Glu Asp Ser Gln 90 Ala Leu Ser Lys Asn 170 | Asn Ser Ser 75 Asn Gly Lys Glu Glu 155 Gly | Asn Val Asn 60 Ile Asn Ala Asn Thr 140 Gly Thr | Ser Lys 45 Ala Asp Gly Tyr Glu 125 Phe Val Lys | Gly 30 Gly Val Glu Leu Ala 110 Gly Thr | 15 Lys Pro Leu Ile Asp 95 Ile Leu Asn Asp | Asp Asn Leu Ala 80 Thr Ser Lys Lys Ala 160 Gly | |
| <pre><400> 82 Arg Leu Leu Ile 1 Gln Lys Gly Ala 20 Gly Asn Thr Ser 35 Leu Thr Glu Ile 50 Ala Val Lys Glu 65 Ala Lys Ala Ile Glu Tyr Asn His 100 Thr Leu Ile Lys 115 Glu Lys Ile Asp 130 Leu Lys Glu Lys 145 Asp Ala Lys Glu</pre> | Gly Phe 5 Glu Ser Ala Asn Ser Lys Val Glu 70 Gly Lys 85 Asn Gly Gln Lys Ala Ala His Thr 150 Ala Ile 165 Gly Lys | Ile Gly Ser Ala 40 Lys Ile 55 Ala Leu Lys Ile Leu Asp 120 Lys Lys 135 Asp Leu Leu Lys Leu Phe | Ser 25 Asp Thr Leu 105 Gly Cys Gly Thr Glu 185 | Glu Asp Ser Gln 90 Ala Leu Ser Lys Asn 170 Ser | Asn Ser Ser 75 Asn Gly Lys Glu 155 Gly Val | Asn Val Asn 60 Ile Asn Ala Asn Thr 140 Gly Thr | Ser Lys 45 Ala Asp Gly Tyr Glu 125 Phe Val Lys | Gly 30 Gly Val Glu Leu Ala 110 Gly Thr Thr | 15 Lys Pro Leu Ile Asp 95 Ile Leu Asn Asp Lys 175 Ser | Asp Asn Leu Ala 80 Thr Ser Lys Lys Ala 160 Gly Lys | |
| <pre><400> 82 Arg Leu Leu Ile 1 Gln Lys Gly Ala 20 Gly Asn Thr Ser 35 Leu Thr Glu Ile 50 Ala Val Lys Glu 65 Ala Lys Ala Ile Glu Tyr Asn His 100 Thr Leu Ile Lys 115 Glu Lys Ile Asp 130 Leu Lys Glu Lys 145 Asp Ala Lys Glu Leu 180</pre> | Gly Phe 5 Glu Ser Ala Asn Ser Lys Val Glu 70 Gly Lys 85 Asn Gly Gln Lys Ala Ala His Thr 150 Ala Ile 165 Gly Lys Met Leu | Ile Gly Ser Ala 40 Lys Ile 55 Ala Leu Lys Ile Ser Leu Asp 120 Lys Lys 135 Asp Leu Leu Lys Leu Phe Ala Asr 200 | Ser 25 Asp Leu 105 Gly Cys Gly Thr 185 Ser | Glu Asp Ser Gln 90 Ala Leu Ser Lys Asn 170 Ser Val | Asn Ser Ser 75 Asn Gly Lys Glu 155 Gly Val Lys | Asn Val Asn 60 Ile Asn Ala Asn Thr 140 Gly Thr Glu Glu | Ser Lys 45 Ala Asp Gly Tyr Glu 125 Phe Val Lys Val Leu 205 | Gly 30 Gly Val Glu Leu Ala 110 Gly Thr Thr Thr Thr | 15 Lys Pro Leu Ile Asp 95 Ile Leu Asn Asp Lys 175 Ser Ser | Asp Asn Leu Ala 80 Thr Ser Lys Lys Ala 160 Gly Lys Pro | |

| | | 1 | | | 1 | | | | | | | 99/: | 102 | | | | | | |
|-----|--------|---|------------|----------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----|
| Sub | 14. | 7 | Lys 225 | Asp | Gly | Asn | Thr | Ser 230 | Ala | Asn | Ser | Ala | Asp 235 | Glu | Ser | Val | Lys | Gly 240 | |
| 2, | | | | Asn | Leu | Thr | Glu 245 | | Ser | Lys | Lys | Ile 250 | | Glu | Ser | Asn | Ala 255 | | |
| | | | Val | Leu | Ala | Val 260 | | Glu | Ile | Glu | Thr 265 | | Leu | Ala | Ser | Ile 270 | | Glu | |
| | | | Leu | Ala | Thr 275 | | Ala | Ile | Gly | Lys 280 | | Ile | Gln | Gln | Asn 285 | _ | Gly | Leu | |
| | | | Ala | Val 290 | Glu | Ala | Gly | His | Asn 295 | | Thr | Leu | Leu | Ala 300 | | Ala | Tyr | Thr | |
| | | | Ile 305 | | Lys | Leu | Ile | Thr 310 | | Lys | Leu | Asp | Gly 315 | - | Lys | Asn | Ser | Glu 320 | |
| | | | | Leu | Lys | Glu | Lys 325 | | Glu | Asn | Ala | Lys 330 | | Cys | Ser | Glu | Asp 335 | | |
| | | | Thr | Lys | Lys | Leu 340 | | Gly | diu | His | Ala 345 | Gln | Leu | Gly | Ile | Glu 350 | Asn | Val | |
| | | | Thr | Asp | Glu 355 | Asn | Ala | Lys | Ly | Ala 360 | Ile | Leu | Ile | Thr | Asp 365 | Ala | Ala | Lys | |
| | | | Asp | Lys 370 | Gly | Ala | Ala | Glu | Leu 375 | Glu | Lys | Leu | Phe | Lys 380 | Ala | Val | Glu | Asn | |
| | | | Leu 385 | Ala | Lys | Ala | Ala | Lys 390 | Glu | Met | Leu | Ala | Asn 395 | Ser | Val | Lys | Glu | Leu 400 | |
| | | | | | | | | | | / | \ | | | | | | | | |
| | | | | 0> 83 l> 12 | | | | | | | | | | | | | | | |
| | J. | | | 2> Di 3> os | NA spC (| Chime | era | | | | | | | | | | | | |
| | | | <220 | | | | | | | | ' | \ | | | | | | | |
| | | | | L> CI 2> (1 |)S 1) | . (123 | 36) | | | | | | | | | | | | |
| | n L | | | 0> 83 | 3 tta | ++= | 2+2 | aaa | +++ | act | tta | aca | tta | act | tta | ata | aaa | tat | 48 |
| : | Ű. | | | | Leu | | | | | | | | | | | | | | 10 |
| | | | | caa | aaa | aat. | | aaa | tca | att | gga | | tot | agt | aat | tca | | aaa | 96 |
| | | | | | Lys | | | | | | | | | | | | | | |
| | | | aat | aaa | gat | | aca | tct | act | aat | cct | act | gac | dag | tct | aca | aaa | ggg | 144 |
| | | | | | Asp 35 | | | | | | | | | | | | | | |
| | | | cct | aat | ctt | aca | gaa | ata | agc | aaa | aaa | att | aca | gat | tct | aat | gca | ttt | 192 |
| | | | | | Leu | | | | | | | | | | | | | | |
| | | | gta | ctt | gct | gtt | aaa | gaa | gtt | gag | act | ttg | gtt | tta | tct | ata | gat | gaa | 240 |
| | | | Val 65 | Leu | Ala | Val | Lys | Glu 70 | Val | Glu | Thr | Leu | Val 75 | Leu | Ser | \le | Asp | Glu 80 | |
| | | | ctt | gct | aag | aaa | gct | att | ggt | caa | aaa | ata | gac | aat | aat | aat | ggt | tta | 288 |
| | | 1 | Ton | 70 1 - | T | T | Δla | TIA | GIV | CID | ITTO | TIO | Acn | Acn | Acn | Δent | (2) 1 37 | 1 0 11 | |
| | | | ьеи | Ala | ьys | гуѕ | 85 | 110 | Ory | GIII | пур | 90 | nsp | POII | ASII | 71511 | 95 | Leu | |

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|--|--|--|---|--|--|--|---|--|---|---|--|--|--|--|--|
| | | | | | | | | | | | | | | | 384 |
| | | | | | | | | | | | | | | | 432 |
| | | | | | | | | | | | | | | | 480 |
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| | | | | | | | | | | | | | | | 576 |
| | | | | | | | | | | | | | | | 624 |
| | | | | | | | | | | | | | | | 672 |
| | | | | | | | | | | | | | | | 720 |
| | | | | | | | | | | | | | | | 768 |
| | | | | | | | | | | | tct Ser 270 | ata Ile | gat Asp | | 816 |
| | | | | | | | | | | | | | | | 864 |
| | | | | | | | | | | | | | | | 912 |
| | | | | | | | | | | | | | | | 960 |
| | | | | | | | | | | | | | | | 1008 |
| Ala tcar ser ttau 130 aatn gatp aaas Lys ttau agtr 210 tcar ccto ttau cttu aasn 290 tcar aag | Ala Leu tca acc Ser Thr 115 tta aag Leu 130 aat aaa Asn Lys gat Asp aaa ggt Lys agt Cct 210 tca ggty cct aat Pro 210 tca ggty ctta Leu Leu tca Ctg Leu tca Ctg Leu tca Glu 290 tca aaa Asn 290 tca aaa Asn 290 tca aaa Asn 290 tca aaa | Ala Leu Asn 1000 tca acc cta Thr Leu 115 tta aaag aca Leu Lys Thr 130 aat aaa cta Asn Lys Cat Asp Ala 180 tta aaa gca Leu Lys Ala 195 agt cct gtt 210 tca ggt ggg ggg Gly Ctt Leu Leu Leu Asn Leu Leu Ala 260 ctt tca aaa Leu 260 ctt tct aaaa Leu 275 aac gaa gca Asn Glu Ala 290 tca aaa cta Ser Lys Leu aaa aaa aaa | Ala Leu Asn Asn 100 tca acc cta ata Ile Ile Ile Ils tta aaag aca gaa Leu Lys Leu Lys gat aaa cta aaa Asn Lys Cat Ala 165 aaa ggt gct aaa Lys Ala 195 tta aaa gca gct Leu Lys Ala 195 agt cct gtt gta 210 tca ggt ggg gat Ser Pro Val Val 210 tca ggt ggg gat Ser Cat Asn Leu Ala 245 tta ctg gct gtg Leu Leu Lys Ala 260 ctt tct aaa gct gtg Leu Leu 260 ctt tct aaa gct aat Asn 290 tca aaa cta aaa gct aaac Asn Glu Ala Asn 290 tca aaa cta ata Ser Lys Leu Ile aag aaa aaa att Lys Lys Ile | Ala Leu Asn Asn Gln tca acc cta ata aca Ser Thr Leu Ile Thr 115 tta aag aca gaa att Leu Lys Thr Glu Ile 130 aat aaa cta aaa agt Asn Lys Leu Lys Ser 150 gat Asp His Ala Lys 165 aaa ggt gct aaa gaa Lys Gly Ala Lys Glu 180 tta aaa gca gct caa Leu Lys Ala Ala Gln 195 agt cct gtt gta gca Ser Pro Val Val Ala 210 tca ggt ggg gat tct Ser Gly Gly Asp Ser 230 cct aat ctt acc gta Pro Asn Leu Thr 245 tta ctg gct gtg aaa Leu Leu Ala Val Lys 260 ctt tct aaa gca att Leu 275 aac gaa gca aat cga Asn Glu Ala Asn Arg 290 tca aaa cta ata aca Ser Lys Leu Ile Thr 310 aag aaa aaa att aaa Lys Lys Ile Lys | Ala Leu Asn Asn Gln Asn to acc cta ata aca gaa at gca Leu Lys Thr Glu IIe Ala 130 gat gat cat cat aaa agt ggt Asn Lys Leu Lys Ser Gly 150 gat gat his Ala Lys Ala 165 aaa ggt gct aaa gaa ttt Lys Gly Ala Lys Glu Phe 180 tta aaa gca gct caa gta Leu Lys Ala 195 agt cct gtt gta gca gaa Ser Pro Val Val Ala Glu 210 cct aat ctt acc gta ata Cya Ser Ala 230 cct aat ctt acc gta ata Pro Asn Leu Thr Val Ile 245 tta ctg gct gtg aaa gaa Leu Leu Ala Val Lys Glu 260 ctt tct aaa gca gct att ggt acc gaa Ala Val Lys Glu 260 ctt tct aaa gct gtg aaa gaa Leu Leu Ala Val Lys Glu 260 ctt tct aaa gct gtg aaa gaa Can Ser Lys Ala Ile Gly 275 tca aaa cta at cta Asn Arg Asn 295 tca aaa cta ata aca caa gag Lys Lys Lys Ile Lys Glu aag aaa aaa aaa att aaa gag Lys Lys Lys Ile Lys Glu | Ala Leu Asn Asn Gln Asn Gly tca acc cta ata aca gaa aaa Ser Thr Leu lle Thr Glu Lys 115 tta aag aca gaa att gca aag Leu Lys Thr Glu lle Ala Lys 130 aat aaa cta aaa agt ggt Cat Asn Lys Leu Lys Ser Gly His 150 gat gat Cat gca aaa gca gct Asp Asp His Ala Lys Glu Phe Lys 180 tta aaa ggt gct aaaa gaa ttt aaa Leu Lys Ala Ala Cgn gca agt Ser Pro Val Val Ala Glu Ser 210 cct aat ctt acc ggt ggg gat tct gca Ser Gly Gly Asp Ser 210 cct aat ctt acc gta gaa agt Leu Leu Ala Val Lys Glu Val Leu Leu Ala Val Lys Glu Val ctt tct aaa gca gct aaa gaa gta Leu Leu Ala Val Lys Glu Val cct tct tct aaa gct gta aaa gca Asn Glu Ala Asn Arg Asn Glu 290 aag aaa aaa att aaa gag gct Lys Lys Lys Ile Lys Glu Ala | Ala Leu Asn 100 Asn Gli Asn Gly Ser 105 tca acc cta ata aca gaa aaa ttg Ile Thr Glu Lys Leu 120 tta aag aca gaa att gca aag gct Lau Lys Leu Lys Ser Gly His Ala Iso gat gat cat gca aaa gca gct gct Asp Asp 180 tta aaa gct Ala Lys Glu Phe Lys Asp 180 tta aaa gct gct aaa gaa ttt aaa gca gat Lys Asp 180 tta aaa gca gct Caa gaa gta gat Lys Asp 180 tta aaa gca gct Gly Ala Ile Lys Ala Ala Ile Ile Lys Asp 180 tta aaa gca gct gct aaa gaa ttt aaa gct gat Lys 200 agt gt gt gt gt gca gaa gat gct act act Asp Asp 185 tca ggt ggg gat lct gca gaa gct gcc Ser Gly Gly Asp 230 cct aat ctt acc gta gaa agt cca gaa ser Pro 230 cct aat ctt acc gta gca gaa gct Ile Ser Ile Lys 245 tta ctg gct gtg aaa gaa gt gcg aaa Pro 245 tta ctg gct gtg aaa gaa gaa gt gaa gaa gt gct act gca lys 245 tta ctg aaa gca aat cga aac gaa gaa gaa gaa gaa gaa gaa gaa | Ala Leu Asn Asn Gln Asn Gly Ser Leu 100 tca acc cta ata aca gaa aaa ttg agt 120 tta aag aca gaa att gca aag gct aag Leu Lys Thr Glu Ile Ala Lys Ala Lys Ala Lys aat aaa cta aaa agt ggt cat gca gat Asn Lys Leu Lys Ser Gly His Ala Asn Lys Cal His Ala Lys Ala Lys gat gat cat gca aaa gca gct att ta Asp Asp Asp His Ala Lys Glu Phe Lys Asp Leu 180 tta aaa ggt gct aaa gaa ttt aaa gca act act Leu Lys Ala Lys Ala Chu Thr 195 agt cct gtt gta gca gaa agt cca aaa Ser Pro Val Val Ala Glu Ser Pro Lys 210 tca ggt ggg gat tct gca gaa agt cca aaa Ser Gly Gly Asp Ser Ala Ser Thr Asn 230 cct aat ctt acc gta aaa gaa gta gca aaa aaa Cta Ala Leu Lys Lys Ala Leu Leu Leu Ala Val Lys Glu Val Glu Ser Lys Lys 250 tta ctg gct gtg gaa aaa gaa gtt gag gct Leu Leu Leu Ala Val Lys Glu Val Glu Ala Lys 280 ctt tct aaa gct gtg aaa gaa gtt gag gct Leu Ser Lys Ala Leu Lys Chu Ser Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys | Ala Leu Asn Asn Gin Asn Giy Ser Leu Leu 100 tca acc cta ata aca gaa aaa ttg agt aaa Leu Lys Thr Leu Ile Thr Giu Lys Leu Ser Lys 115 tta aag aca cta aaa agt ggt cat gaa gat Lys 130 aat aaa cta aaa agt ggt cat gaa gat ctt Asn Lys Leu Lys Ser Giy His Ala Lys Leu 155 gat gat cat gaa ag gca ggt at tta Leu Lys 165 gat ggt ggt aaa gca gca gtt Lys 170 aaa ggt ggt aaa gaa ttt aaa ggt ggt at tta Leu Lys 180 tta aaa gca gct caa gta gat tta Leu Lys 190 tta aaa gca gct caa gta gca cta act Asn 195 agt cct gtt gta Gin Val Ala Leu Thr Asn 195 tca ggt ggg ggt stct gca gaa agt cca aaa aaa Ser Pro Val Val Ala Glu Ser Pro Lys Lys 125 tca ggt ggg ggt stct gca ser Pro Lys Lys 215 tca ggt ggg gat tct gca ser Pro Lys Lys 11e tca ctg gct gct aaa gaa gaa gtt ga aaa aat tcu Leu Leu Ala Val Lys Glu Val Glu Ala Leu Lys 125 tta ctg gct gtg aaa gaa gaa gtt ga gad gct ttg Leu Leu Ala Val Lys Glu Val Glu Ala Leu 250 tta ctg gct gtg aaa gaa gaa gtt ga gad gct ttg Lys 275 tta ctg gct gtg aaa gaa gaa aaa ata aaa caa caa gaa gca gaa gca aaa att 265 tta ctg gct gtg aaa gaa gaa gtt gag gct ttg Lys 275 aac gaa gca aat caa aat ggd aac aaa ata aaa caa gaa gaa caa aaa ata aaa caa gaa gaa gca aaa aaa ata aaa caa gaa gaa gca aaa aaa ata aaa caa gaa gaa aaa aaa ata aaa caa gaa gaa aaa aaa ata aaa caa aaa gaa gaa aaa aaa ata aaa caa aaa aaa aaa aaa a | Ala Leu Asn Asn Gln Asn Gly Ser Leu Leu Ala 100 los los los los los los los los los los | Ala Leu Asn Asn Gin Asn Giy Ser Leu Leu Ala Giy tca acc cta ata aca gaa aaa ttg aga aaa ttg aaa Ser Thr Leu Ile Thr Glu Lys Leu Ser Lys Leu Lys 115 tta aag aca gaa att gca aag gct aag aaa tgt tcc Leu Lys Thr Glu Ile Ala Lys Leu Ser Lys Leu Lys 130 aat aaa cta aaa agt ggt cat gca gat ctt ggc aaa Asn Lys Leu Lys Ser Gly His Ala Asp Leu Gly Lys 150 gat gat cat gca aaa gca gct att tta aaa aca cat Asp Asp His Ala Lys Glu Phe Lys Asp Leu Lys Thr His 165 aaa ggt gct aaa gaa ttt aaa ggt gt tta ttt gaa tca Lys Gly Ala Lys Glu Phe Lys Asp Leu Phe Glu Ser 180 tta aaa gca gct caa gta gca cta act att ta aaa ac cat Lys Ala Ala Gln Val Ala Leu Thr Asn Ser Val 200 agt cct gtt gta gca gaa agt cca aaa aaa cct cat Ser Pro Val Val Ala Glu Ser Pro Lys Lys Pro His 210 cct aat ctt acc gca aaa gaa gt cca aaa aaa cct cat Ser Gly Gly Asp Ser Ala Ser Thr Asn Pro Asp Glu 230 cct aat ctt acc gta ata agc aaa aaa att aca gat Pro Asn Leu Thr Val Ile Ser Lys Lys Ile Thr Asp 245 tta ctg gct gtg aaa gaa gt gag gct ttg ctt ca Leu Leu Ala Val Lys Glu Val Glu Ala Leu Leu Leu Ser 260 ctt tct aaa gct att gg aaa aaa aaa aaa att aca 275 aac gaa gca aat cga aac gaa tcc ttg at aaa aaa att aca 286 ctt tct aaa gct att ggt aaa aaa aaa att aca 287 cta aaa cta aaa gct att ggt aaa aaa aaa att aca 287 cta caaa cta aaa gct att ggt aaa aaa aaa att aca 287 cta aaa cta aaa gct att ggt aaa aaa att aca 288 cta tct gct gtg aaa gaa gtt gag gct ttg ctt tca Leu Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser 280 cta aaa cta aaa caa aat cga aac caa aaa tta aaa aat gat Leu Ser Lys Lys Asn Asp 280 cta aaa cta aaa aca caa aaa tta agt Asn Glu Ala Asn Arg Asn Glu Ser Leu Ile Ala Gly 300 cta aaa cta ata aaa aca caa aaa tta agt gta ttg aat 290 cta aaa aaa att aaa aga gct aag gat tgt tcc caa 295 aag aaa aaa att aaa gag gct aag gat tgt tcc caa 295 cta aaa aaa att aaa aga gct aag gat tgt tcc caa 295 cta aaa aaa att aaa aga gct aag gat tgt tcc caa 295 cta aaa aaa aaa att aaa aga gct aag gat tgt tcc caa 295 cta aaa aaa aaa att aaa gag gct aag gat gt gt tcc caa 29 | Ala Leu Asn Asn Gln Asn Gly Ser Leu Leu Ala Gly Ala 100 100 110 110 110 110 110 110 110 11 | Ala Leu Asn asn Gin Asn Giy Ser Leu Leu Ala Giy Ala Tyr 100 tca acc cta ata aca gaa at try aga asa tty aga as tty aga as at tta aga aca cta aga aga at try aga as at try aga as at try aga as at try aga as at try aga as aga at try aga as aga aga leu Lys Thr Giu Ile Ala Lys Ala Lys Lys Lys Cys Ser Giu Giu 130 aat aaa cta aaa agt got cat goa gat ctt ggc aca ga aca gat Asn Lys Leu Lys Ser Giv His Ala Asp Leu Giy Lys Gin Asp 155 gat gat cat gca aaa gca got att ta aaa aca cat gca act Asp Asp His Ala Lys Ala Ala Ile Leu Lys Thr His Ala Thr 175 aaa ggt gct aaa gaa ttt aaa ggt tta ttt gaa tca gta gat Leu Lys Giv Ala Lys Giu Phe Lys Asp Leu Phe Giu Ser Val Giu 190 tta aaa ggt gct aaa gaa gca gct cta act act act gca gat Leu Lys Ala Ala Gin Val Ala Chu Thr Asn Ser Val Lys Giu 200 agt cct gtt gta gca gaa agt cca aaa aca cct cat agg gat ct Lys Asp Leu Phe Giu Ser Val Lys Giu 200 agt cct gtt gta gca gaa agt cca aaa aca cct cat agg gat cct gca gg gg gg gat tct gca cat act act act act act act act act a | Ala Leu Asn Asn Gin Asn Gin Asn Giv Ser Leu Leu Ala Giv Ala Tyr Ala 100 100 100 100 100 100 100 100 100 10 | tca acc cta ata aca gaa aaa ttg agt aaa ttg aaa aat tta gaa Ser Thr Leu Ile thr Glu Lys Leu Ser Lys Leu Lys Asn Leu Glu 115 tta aag aca gaa att gca aag gct aag aaa tgt tcc gaa gaa ttt Leu Lys Thr Glu Ile Ala Lys Ala Lys Lys Cys Ser Glu Glu Phe 130 aat aaa cta aaa agt gct cat gca gat ctt ggc aaa cag gat gct Asn Lys Leu Lys Ser Glu His Ala Asp Leu Gly Lys Gln Asp Ala 150 gat gat cat gca aaa gca gct att tta aaa aca cat gca act acc Asp Asp His Ala Lys Ala Ala Ile Leu Lys Thr His Ala Thr Thr 165 aaa ggt gct aaa gaa ttt aaa gat tta ttt gaa aca cat gca act acc Asp Asp His Ala Lys Glu Phe Lys Asp Leu Phe Glu Ser Val Glu Gly 180 tta aaa gca gct caa gta gca cta act act cat gca gat tta aaa ac cat gca act acc Lys Ala Lys Glu Phe Lys Asp Leu Phe Glu Ser Val Glu Gly 180 tta aaa gca gct caa gta gca cta act act cat tca gtt aaa gaa ctt Leu Lys Ala Ala Glu Val Ala Leu Thr Asn Ser Val Lys Glu Leu 200 agt cct gtt gta gca gaa agt cca aaa aaa cct cat atg gct aat Ser Pro Val Val Ala Glu Ser Pro Lys Lys Pro His Met Ala Asn 210 tca ggt ggg gat tct gca tct act act act cat atg gct aat Ser Gly Gly Asp Ser Ala Ser Thr Asn Pro Asp Glu Ser Ala Lys 230 cct aat ctt acc gta ata agc aaa aaa att aca gat tc at gca aca Ser Gly Gly Asp Ser Ala Ser Thr Asn Pro Asp Glu Ser Ala Lys 240 cct aat ctt acc gta aaa gaa gta gat ttg ttg ctt tca tc at gca Leu Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp 255 tta ctg gct gtg aaa gaa gaa gtt gag gct ttg ctt tca tct ata gat Leu Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp 275 tca aaa caa caa caa ac gaa gca aat caa aaa att aca gat tca tat gaa gaa gca caa ac gaa gca act tta gdt aaa aaa att aca gat gag gct tat gaa Asn Glu Ala Asn Arg Asn Glu Ser Leu Ile Ala Gly Ala Tyr Glu 290 cta aaa cta ata aca caa aaa tta agt gca gag gct tat gaa gaa gaa cta ttg aaa aaa att aca gat taa gca gaa gct tat gaa ac gaa gaa cta ttg aaa aaa att aca gat taa gca gaa gca act tat gaa ac gaa caa caa ac act aca aaa cta aca caa ac ac ac ac ac ac ac ac ac ac |

COCTUD OLLOGICA

| | | | • | ١ | | | | | 101/ | 102 | | | | | | |
|--------------|----------------------------------|------------|-------------------|------------|-------------|-------------------|------------|-------------------|------------|------------|-------------------|-------------|-------------------|------------|------------|------|
| | | | | | | | | | | | | | | | | |
| act Thr | aag Lys | cta Leu | aaa Lys 340 | gat Asp | agt Ser | cat His | gca Ala | gag Glu 345 | ctt Leu | ggt Gly | ata Ile | caa Gln | agc Ser 350 | gtt Val | cag Gln | 1056 |
| | | | | | | gct Ala | | | | | | | | | | 1104 |
| aag Lys | ggt Gly 370 | gct Ala | aaa Lys | gaa Glu | ctt\ Leu | gaa Glu 875 | gag Glu | tta Leu | ttt Phe | aaa Lys | tca Ser 380 | cta Leu | gaa Glu | agc Ser | ttg Leu | 1152 |
| | | | | | | gca Ala | | | | | | | | | | 1200 |
| | | | | | | agt Ser | | | | | taa * | | | | | 1236 |
| <211 <212 |)> 84 l> 41 2> PF 3> os | LO | Chime | era | | | \ | | | | | | | | | |
| |)> 84 | | - 1 | a 1 | 71 | | - | ,, \ | ١ | 7.7 | T . | T 1. | 01 | Q | n1 - | |
| Arg 1 | Leu | Leu | Пе | 61y | Phe | Ala | Leu | Ата | Leu 10 | Ата | Leu | ше | стў | 15 | Ата | |
| Gln | Lys | Gly | Ala 20 | Glu | Ser | Ile | Gly | Ser 25 | Cys | Ser | Asn | Ser | Gly 30 | Lys | Gly | |
| Gly | Asp | | | Ser | Thr | Asn | _ | | Asp | Glu | Ser | | | Gly | Pro | |
| Asn | Leu | 35 Thr | Glu | Ile | Ser | Lys | 40 Lys | Ile | Thr | , Asp | Ser | 45 Asn | Ala | Phe | Val | |
| Leu | 50 Ala | Val | Lys | Glu | Val | 55 Glu | Thr | Leu | Val | Leu | 60 Ser | Ile | Asp | Glu | Leu | |
| 65 Ala | Lvs | Lvs | Ala | Ile | 70 Glv | Gln | Lvs | Ile | Asp | 75\ Asn | Asn | Asn | Glv | Leu | 80 Ala | |
| | _ | _ | | 85 | _ | Gly | _ | | 90 | | \ | | | 95 | | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |
| Ser | Thr | Leu 115 | Ile | Thr | Glu | Lys | Leu 120 | Ser | Lys | Leu | Lys | Asn 125 | Leu | GIu | Glu | |
| Leu | Lys 130 | Thr | Glu | Ile | Ala | Lys 135 | Ala | Lys | Lys | Cys | Ser 140 | Glu | Glu | Phe | Thr | |
| Asn 145 | | Leu | Lys | Ser | Gly 150 | His | Ala | Asp | Leu | Gly 155 | Lys | GÅn | Asp | Ala | Thr 160 | |
| | Asp | His | Ala | | | Ala | Ile | Leu | | | His | Ala | Thr | | | |
| Lys | Gly | Ala | | 165 Glu | Phe | Lys | Asp | | 170 Phe | Glu | Ser | Val | | 175 Gly | Leu | |
| Leu | Lys | | 180 Ala | Gln | Val | Ala | | 185 Thr | Asn | Ser | | | 190 G14 | Leu | Thr | |
| Ser | | 195 Val | Val | Ala | Glu | Ser | 200 Pro | Lys | Lys | Pro | His | 205 Met | Ala | Asn | Asn | |
| Ser | 210 Gly | Gly | Asp | Ser | Ala | 215 Ser | Thr | Asn | Pro | Asp | 220 Glu | Ser | Ala | Lγs | Gly | |
| 225 | - | - | - | | 230 | | | | | 235 | | | | \ | 240 | |

Pro Asn Leu Thr Val\Ile Ser Lys Lys Ile Thr Asp Ser Asn Ala Phe Leu Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu Leu Ser Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp Gly Thr/Leu Asp Asn Glu Ala Asn Arg Asn Gla Ser Leu Ile Ala Gly Ala Tyr Glu Ile Ser Lys Leu Ile Thr Gln Lys Deu Ser Val Leu Asn Ser G‡u Glu Leu Lys Lys Lys Ile Lys Glu Ala Lys\Asp Cys Ser Gln Lys Phe Thr Thr Lys Leu Lys Asp Ser His Ala Glu Lau Gly Ile Gln Ser Nal Gln Asp Asp Asn Ala Lys Lys Ala Ile Leu Lys\Thr His Gly Thr/Lys Asp Lys Gly Ala Lys Glu Leu Glu Glu Leu Phe Lys Ser Leu Glu Ser Leu Ser Lys Ala Ala Gln Ala Ala Leu Thr Asn Ser Val Lys Glu Leu Thr Asn Pro Val Val Ala Glu Ser Pro Lys Lys Pro

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